

June · 1952

Finish

METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

Make "Ceramic" Your Headquarters

for
**COLORS
CHEMICALS
SUPPLIES**

"CERAMIC" maintains constant inventory control of chemicals and, on the basis of past experience, does everything possible to maintain stocks of all essential items. Where demand exceeds supply, its policy continues to be one of fair apportionment among those who have depended upon "Ceramic" in the past.

COLORS: Color Oxides; Screening Colors; Smelter Color Compounds; Printing, Graining, Stamping, Banding and Decalcomania Colors.

CHEMICALS

Aluminum Hydrate
Ammonium Carbonate
Antimony Oxide
Antimony, Black Needle
Arsenic Oxide, White
Barium Carbonate
Barium Chloride
Barium Molybdate
Bentonite
Bone Ash
Borax
Boric Acid
Cadmium Carbonate
Cadmium Sulphide
Calcium Carbonate
Cerium Hydrate

Chromium Oxide
Clay, Enamellers'
Cobalt Carbonate
Cobalt Compounds
Cobalt Nickel
Compounds
Cobalt Oxide
Cobalt Sulphate
Copper Oxide
Cryolite
Epsom Salts
Feldspar
Flint
Fluorspar
Gum Arabic

Gum Tragacanth
Iron Chromate
Iron Oxides
Lead Chromate
Red Lead
Litharge
Lithium Carbonate
Lithium Metasilicate
Magnesium Carbonate
Manganese Dioxide
Molybdenum
Compounds
Nepheline Syenite
Nickel Oxide, Gray
Nickel Oxide, Black

Nickel Sulphate
Opax
Potassium Bichromate
Potassium Carbonate
Potassium Nitrate
Potassium Silico Fluoride
Powder Blue
Pyrophyllite
Rosin
Rutile, Powdered
Soda Ash
Sodium Aluminate
Sodium Antimonate
Sodium Bichromate
Sodium Fluoride

Sodium Nitrite
Sodium Silicate
Sodium Silico Fluoride
Superpax
Talc
Tin Oxide
Titanium Dioxide
Urea Crystals
Whiting
Zinc Oxide
Zircon, Milled
Zircopax
Zirconium Silicate
Zirconium Oxide

SUPPLIES: Screening Oils; Screening and Spraying Equipment; Lining Blocks, Porcelain and Silex; Porcelain Balls; Rounded Flint Grinding Cubes; French Flint Pebbles; Ball Mills, Laboratory and Production; Porcelain Jar Mills, Laboratory and Production; Paste Grinding Mills.



CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.

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to finished product



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Shrouds for Power Mowers

Spacer Rings for Bombs

Bumper Guards

Catalog Racks

Base Plates for Shells



E. E. SOUTHER IRON COMPANY

SHEET METAL STAMPING

1952 KIENLEN AVENUE

ST. LOUIS 20, MISSOURI



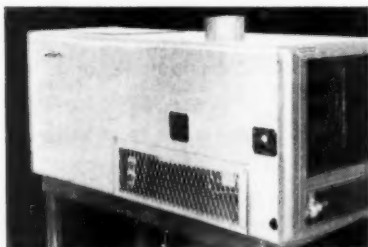
Sicon*

HEAT-RESISTANT FINISH

*A PRODUCT OF THE SILICONES

1. Sicon Protects Gas Heater Combustion Chambers at 875°

2. Sicon in COLORS Preserves Appearance of Heating Equipment Indefinitely



CENTRAL GAS HEATER
Mfg'd by the JOHN ZINK CO., TULSA

For years the protection of combustion chambers and outer coverings of heating equipment has been a problem.

The John Zink Company, a leading manufacturer of gas heaters, solved this problem with SICON.

SICON protects their combustion chambers against extreme high heats of 875° without powdering or losing its color.

SICON, in attractive colors, also preserves the outside appearance of their products, adding greatly to sales appeal, and prolonging life.

The John Zink Company now uses SICON for all hot applications.

Inside and outside—SICON is the finish that can often do the job where all others fail.

WRITE FOR LATEST TECHNICAL DATA TODAY

Sicon

Silicone-Base Finish is manufactured exclusively by

MIDLAND INDUSTRIAL FINISHES CO.

Waukegan, Illinois
ENAMELS • SYNTHETICS
LACQUERS • VARNISHES

INDUSTRIAL MEETINGS

ELECTRIC INSTITUTE MEETING

Edison Electric Institute, 20th annual convention, Cleveland, Ohio, June 2-5.

STOVE MFRS. ANNUAL MEETING

The Institute of Cooking and Heating Appliance Manufacturers, 20th annual meeting and exhibit, The Netherland Plaza, Cincinnati, June 2-4.

CHEMICAL INST. OF CANADA

The Chemical Institute of Canada, 35th annual conference and exhibition, Mount Royal Hotel, Montreal, June 2-4.

WEST COAST ENAMELERS

Pacific Coast Enamellers Club, business meeting, Roger Young Auditorium, Los Angeles, June 6.

ELECTROPLATERS MEETING

American Electroplaters Society, 39th annual convention, Conrad Hilton Hotel, and concurrent Industrial Finishing Exposition of 1952, International Amphitheatre, Chicago, June 16-20.

HOMEFURNISHINGS MARKET

International summer Homefurnishings Market, The Merchandise Mart and American Furniture Mart, Chicago, June 16-26.

ASTM 50TH ANNIVERSARY

American Society for Testing Materials, 50th annual meeting, Statler and New Yorker Hotels, New York City, June 23-27.

NAT'L HOUSEWARES EXHIBIT

National Housewares and Home Appliance Manufacturers Exhibits, Auditorium, Atlantic City, N. J., July 7-13.

HOME LAUNDRY MFRS. MEETING

American Home Laundry Manufacturers Association, summer meet-

ing, Mackinac Island, Michigan, July 27-30.

PORCELAIN ENAMEL FORUM

Porcelain Enamel Institute, 14th annual shop practice forum, September 10-12, University of Illinois, Urbana, Illinois.

PMI ANNUAL MEETING

Pressed Metal Institute, annual meeting, Pocono Manor, Pennsylvania, September 14-18.

IRON, STEEL EXPOSITION

Association of Iron and Steel Engineers, 1952 iron and steel exposition, Public Auditorium, Cleveland, Sept. 30 - Oct. 3.

PACKAGING ENGRS. SHOW

Society of Industrial Packaging and Materials Handling Engineers, 7th annual exposition and concurrent short courses, Coliseum, Chicago, October 14-16.

NAT'L METAL EXPOSITION

National Metal Exposition, Philadelphia, Pennsylvania, October 20-24.

PEI ANNUAL MEETING

Porcelain Enamel Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va., Oct. 22-24.

AGA MEETING, GAMA EXPOSITION

American Gas Association annual meeting, and Gas Appliance Manufacturers Association exposition, Atlantic City, October 27-30.

NEMA ANNUAL MEETING

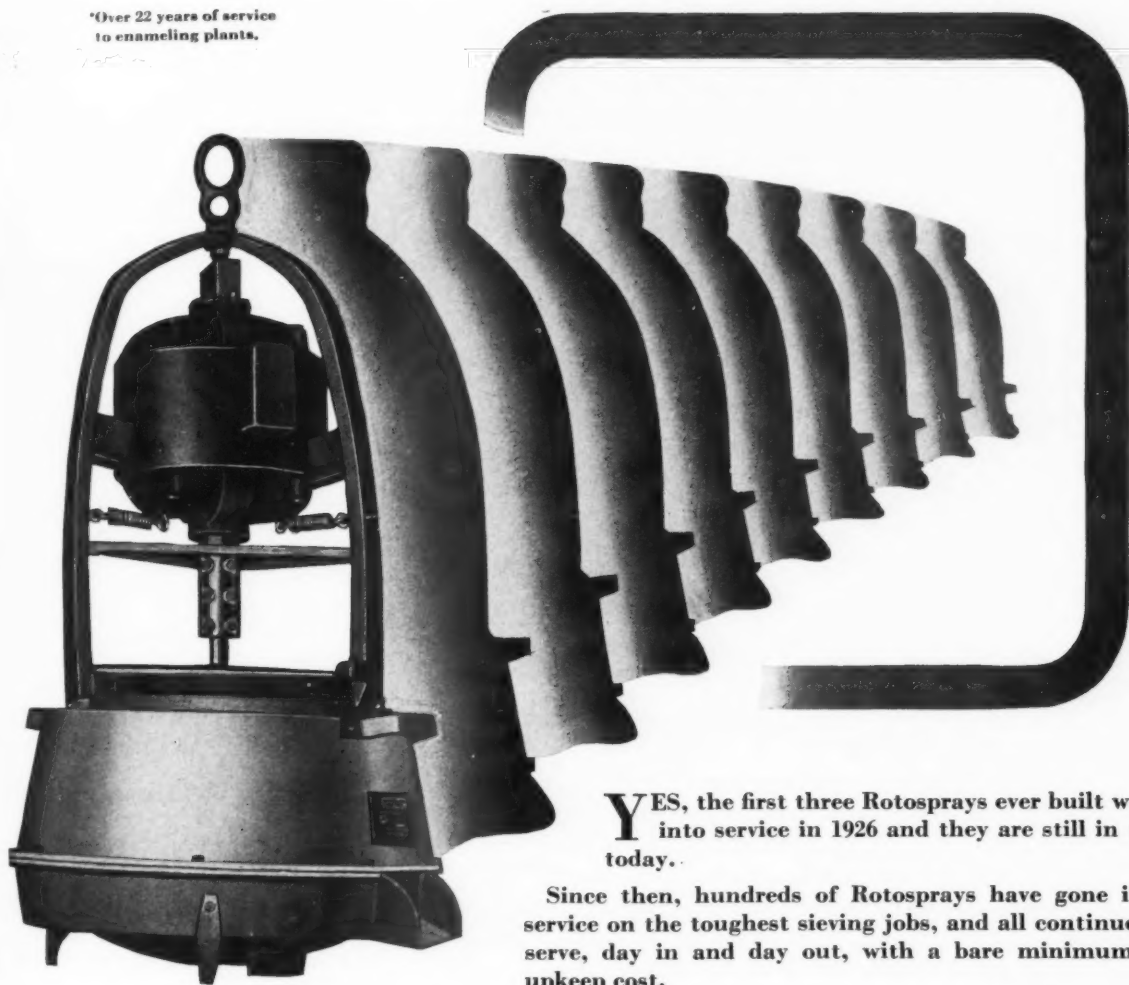
National Electrical Manufacturers Association, annual meeting, Haddon Hall, Atlantic City, November 10-13.

PAINT INDUSTRIES MEETINGS

National Paint, Varnish & Lacquer Association, annual meeting, November 17-19; Federation of Paint & Varnish Production Clubs, annual meeting and industry show, November 20-22, Palmer House, Chicago.

OUR 26th YEAR* —and the 1st Rotospray is still in daily use

*Over 22 years of service
to enameling plants.



YES, the first three Rotosprays ever built went into service in 1926 and they are still in use today.

Since then, hundreds of Rotosprays have gone into service on the toughest sieving jobs, and all continue to serve, day in and day out, with a bare minimum of upkeep cost.

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Foreign representatives—
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AMBLER  PENNA.

Technical Service Data Sheet

Subject: IMPROVING PAINT ADHESION ON STEEL WITH **GRANODINE®**

INTRODUCTION

"Granodine" is a zinc phosphate coating chemical which improves paint adhesion on steel, iron and zinc surfaces. In the Granodizing process, a non-metallic crystalline coating is formed on the treated metal. This bond holds and protects the paint finish and thus preserves the metal underneath.



Official Dept. of Defense Photograph
An F4U Corsair with the Navy's new aircraft anti-tank rocket, the "RAM". A Grade I zinc phosphate finish (JAN-C-490) protects the entire external surface of this rocket and provides a durable bond for the specification paint finish.

"GRANODINE" MEETS SERVICE SPECIFICATIONS

JAN-C-490, Grade I	CLEANING AND PREPARATION OF FERROUS METAL SURFACES FOR ORGANIC PROTECTIVE COATINGS
JAN-F-495	FINISHES FOR EQUIPMENT HARDWARE
U.S.A. 57-0-2C Type II, Class C	FINISHES, PROTECTIVE, FOR IRON AND STEEL PARTS
U.S.A. 51-70-1, Finish 22.02, Class C	PAINTING AND FINISHING OF FIRE CONTROL INSTRUMENTS; GENERAL SPECIFICATION FOR
MIL-V-3329	VEHICLES, COMBAT, SELF-PROPELLED AND TOWED; GENERAL REQUIREMENTS FOR

GRANODIZING DATA

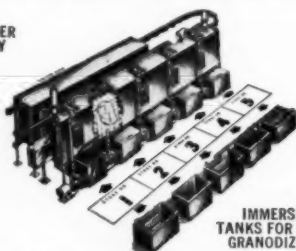
Granodizing is an easily applied chemical process. Depending on the size, nature and volume of production, Granodizing can be carried out by spraying the parts in successive stages of a power washing machine, by dipping the work in the cleaning, rinsing and coating baths contained in tanks, or by brushing or flow coating the work with portable hand equipment. Typical process sequence and equipment requirements are shown below:

MULTI-STAGE POWER
WASHER FOR SPRAY
GRANODIZING

PROCESS SEQUENCE

1. Clean
2. Rinse
3. "Granodine"
4. Rinse
5. Final Rinse

NOTE: Equipment can be of mild steel throughout, except in the Granodizing stage, where nozzles, risers, and pump impeller should be of acid-resistant material.



MANY APPLICATIONS

Automobile bodies and sheet metal parts, refrigerators, washing machines, cabinets, etc.; projectiles, rockets, bombs, tanks, trucks, jeeps, containers for small arms, cartridge tanks, 5-gallon gasoline containers, vehicular sheet metal, steel drums and, in general, products constructed of cold-rolled steel in large and continuous production are typical of the many products whose paint finish is protected by "Granodine".



WRITE FOR FURTHER INFORMATION ON "GRANODINE"
AND YOUR OWN METAL PROTECTION PROBLEMS.



From the Editor's pen

"push-button" fabrication

Gentlemen:

The April issue of *"finish"* has just come to my desk, and I was delighted to find the center spread covering plans for increasing our capacity at the Kankakee plant.

The work on this project is being expedited with all possible speed. The mash seam welder is already completed and being installed this month and, although some of the other equipment has slow delivery promises due to the defense effort, we are certainly looking forward to the completion of this project.

F. S. Cornell
General Manager
A. O. Smith Corporation
Kankakee, Illinois

"hot" water heaters

Gentlemen:

You will be interested to know that A. O. Smith Corp. does not produce *hot water heaters* as mentioned in the April issue of *finish* (page 48).

They do produce *water heaters*. There is no point in heating hot water. I was guilty of the same error, and am sure we have a lot of company.

A. R. Leyerle
Vitreous Steel Products Co.
Cleveland, Ohio

many thanks for the correction. Many *finish* readers will catch themselves on this one.

standardization of whites

Gentlemen:

I have read your editorial in the April issue of *finish*. Please accept my congratulations on a job very well done and from which we should hear considerable comment. I am very hopeful that this opening gun in the campaign to standardize on white in the appliance field will soon lead to action. If there is anything we can do to assist in this job, please let us know. . . .

L. A. Adams
Assistant to the Vice President
Chicago Vitreous Enamel Product Co.
Cicero, Illinois

ADS OUT



"Mt. Fuji from Lake Yamana"

by Lt. Col. E. A. Blount, HQ FEAMCOM

TEN DOLLARS will be paid to any finish reader for a black on white 8 x 10 enlargement chosen for this page. Sports subjects or plant operations given preference.

Camera: A Nikon 35 mm.
Haze Filter, 1/100 sec., f/4

If your
Enameling Costs
look like this . . .



call in the
man who knows
how to get
them down . . .
the ING-RICH
Service
Engineer !

Titanium takes the test

an answer to many of the aircraft designer's problems

by William S. Cockerell •

DIRECTOR, DEVELOPMENT LABORATORIES, RYAN AERONAUTICAL CO., SAN DIEGO, CALIFORNIA



Titanium — most modern metal of Industry — is nature's paradox. More than any other element, this metal seems to exhibit exasperatingly contradictory behavior. With an extremely high melting point for its weight — higher than steel — it still will not withstand continued use at high temperatures. So "affectionate" for other elements that is never found free, and instantly combines with other substances when molten, it will not weld with any other metals by known processes.

Titanium is endowed with some of nature's choice characteristics which seem to be especially planned for aircraft applications. For this reason, the Ryan Development Laboratories have recently completed studies of the bright newcomer, which involve the forming of intricate structures, by established procedures developed for stainless steel.

Because titanium falls between the aluminum and steel alloys in both strength and resistance to temperature, it is the answer to many of the aircraft designer's problems. For years, engineers have been forced to specify heavier steel alloys in the design of structures which required more strength than aluminum alloys could provide at elevated temperatures. Because the aluminum alloys lose strength rapidly at temperatures above 300°F, this meant that a wide variety of components, such as fire walls, ducts and shrouds, had to be built of stainless steel.

Titanium retains its exceptional

strength up to temperatures of approximately 300°F. It weighs only 56 per cent as much as steel and approaches the best steels in strength. Some titanium alloys can now provide 175,000 psi tensile strength and new types with 200,000 psi are being developed. With a lower linear coefficient of expansion and thermal conductivity than either aluminum or steel alloys, titanium is the only metal known to have an endurance strength consistently in excess of 50 per cent of its tensile strength.

In research at Ryan, flat sheet was formed to complex shapes to shroud the high temperature exhaust system

which Ryan builds for the Piasecki HUP-1 helicopter. This part operates at a temperature of 400°F. to 500°F. and appears to be an ideal application which combines the weight-saving and heat-resisting qualities of the metal. Also, it involves severe forming and resistance welding.

One of the basic aims of the investigation was to determine the adaptability of the machines and procedures, used in forming stainless steel components, to the forming of titanium parts. Obviously economic advantages could be gained if conversion from stainless steel to titanium fabrication could be made

Experimental assembly of shrouded Piasecki exhaust system to check fit of all stainless steel and titanium components. This system channels the hot exhaust gases from the engine which powers the HUP-1 helicopter. Engine is "buried" in the aircraft for aerodynamic and dynamic reasons.



Quantitative evaluation of various annealing and pre-heat treatments

Deforming Temp.	Treatment	Deforming Characteristics
Room	None	Cracked when deformation was about 50% complete.
Room	Deformed 50% of possible, annealed 1 hr. at 1170°F. Deformation then completed.	No cracking.
Room	Deformed 50% of possible, annealed 40 min. at 1170°F.	No cracking.
Room	Deformed 50% of possible, annealed 20 min. at 1170°F. Deformation then completed.	Cracking appeared imminent.
450°F	Previously heated to 1300°F.	Cracked when deformation was nearly complete.
750°F	None	Cracked when deformation was about 75% complete.
1000°F	None	No cracking.
1300°F	None	No cracking.

without extensive re-tooling.

Little information is available on the production forming of titanium due to the fact that it made its commercial debut in 1946, and only 60 tons of the metal were refined in 1950. The Ryan Laboratory established an experimental production procedure to determine the behavior of titanium when welded, formed and heat treated. To check the effectiveness of cold forming plus annealing and hot working of titanium, a number of sheets of .018" and .037" metal were used.

Closer tolerances are required for titanium parts than for stainless steel because excessive "springiness" makes mating more difficult. Frederick Dever (left), spot weld engineer, and Dave Adams, metallurgist, check dimensions of Piasecki shroud section which Ryan fabricated from titanium.



A spherical cavity was machined into a steel plate. The diameter of the cavity was $\frac{3}{4}$ inch and the depth $\frac{7}{32}$ inch. By measuring the total deformation possible after forcing the titanium into the cavity with a steel ball, using an impact load, it was possible to obtain quantitative evaluation of various annealing and pre-heat treatments. The results are shown in the accompanying table.

These tests indicated that either alternate cold forming and annealing, or hot forming would be feasible. If cold forming and annealing are

used, the point at which the part should be removed from the die is critical.

Hot forming procedure

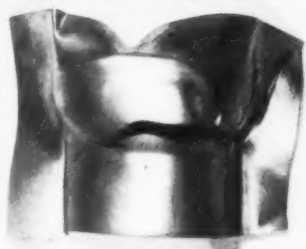
In hot forming procedure, the part was placed in one end of the body half-stamping die, heated to medium red heat and deformed almost to completion. The part was then reheated and deformation completed. No springback occurred. A noticeable amount of lead adhered tightly to the surface which was struck by the lead punch. The part was successfully formed by drawing, heating and hand-working in successive operations. The initial draw was fairly deep and entirely satisfactory.

An attempt was made to cold form two supports from the .037" material. The metal was placed in the die and hit several times. Forming was satisfactory except for a springback of about $\frac{1}{8}$ inch measured at the ends. Annealing did not alleviate this condition. The thickness loss was found to be from .002" to .003" at the points of maximum deformation.

The scale on the hot formed parts was removed by placing them for five minutes in a salt bath descaling tank which consisted of a mixture of sodium hydroxide and sodium nitrate at 350°F. After rinsing, they were dipped for 30 seconds in a cold pickle solution of 46 per cent nitric acid and 8 per cent hydrofluoric acid to remove the titanium dioxide which formed in the salt bath.

Good spotweld results were obtained, in spot welding titanium to itself, with machine settings which produced penetrations from between 70 per cent and 90 per cent. Shear values were approximately 650 pounds for the .018" commercially pure titanium and 1300 pounds for .037" combinations. No success was experienced in spot welding titanium to other metals.

From these experimental investigations, Ryan development engineers are convinced that most stainless steel forming techniques can be adapted to the fabrication of titanium parts, similar to the Piasecki shroud. The metal should be deformed at temperatures between 800°F. and 1,000°F.



Left: Cracked titanium shroud forming which was formed by procedure involving cold forming and annealing. Crack was caused by difficulties in determining cold-forming limits of metal in the die. For this reason, hot forming is more desirable.



Right: Close-up view of part of Ryan-designed exhaust system shroud section for Piasecke engine installation. Note the complex, deep-drawn contours and spot welding.

preferably closer to the maximum temperature. Although lead dies are not practical, because of the lead pick-up, steel or cast iron dies should prove satisfactory. Heated dies would be desirable and economic for large-run production. Use of a controlled atmosphere furnace would prevent the formation of most scale due to heating.

Although discovered back in 1791 by an English clergyman named Gregor, titanium was not produced commercially until 1946 when William Kroll, U. S. Bureau of Mines engineer, evolved a process for separating it from its ore. A clue to the tremendous affinity which titanium has for other substances can be gleaned from the fact that the ore can be purchased in the market at only two cents a pound but the refined metal costs from \$10.00 to \$20.00 per pound.

Greatest immediate use for titanium and its alloys will undoubtedly be in the formation of aircraft "skins", or surfaces, for supersonic planes. Friction induced heat is now zooming temperatures of these high speed aircraft to well above aluminum alloy's limits. Titanium could handle these critical temperatures with ease and buoyancy.

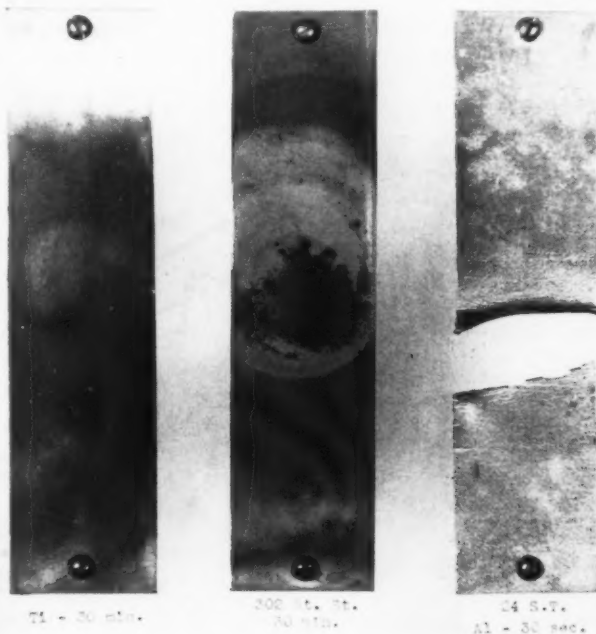
Keenest disappointment which titanium has caused metallurgists, who looked with relish upon its 3150°F. melting point and hexagonal crystal-line structure, is its inadequacy to withstand continued temperatures above 1,000°F. For short periods, titanium behaves beautifully. At exposures to 2,000°F. flames, aluminum plates disintegrated in less than one minute and titanium showed no adverse effects after 30 minute exposure. Upon cooling to room temperature, it had regained its typical annealed strength.

However, under continual temperatures of more than 1,000°F., titanium suffers an irreversible absorption of oxygen and nitrogen which rapidly reduces its ultimate and yield strengths and causes it to become brittle. If this deficiency could be overcome, so that titanium would remain useful up to temperatures of 1600°F., a whole new field of applications would be uncovered. Combustion chambers, inner and outer cones, tail-pipes and transition liners for jet engines would use large quantities of the metal.

Ryan development engineers and metallurgists are working on this avenue of research which falls into Ryan's extensive experience with high

temperature applications. Because titanium's deterioration at continued high temperatures appears to be due to events which occur at the surface of the metal, great hope is held for its future in these hot spots if something can be done to protect its surfaces against oxidation and absorption. Ryan metallurgists are experimenting with new ceramic coatings on titanium to determine the success of these materials which have been so beneficial in preventing the oxidation of stainless steels at very high temperatures. The outcome of these important evaluations may have an important influence upon the employment of titanium in these specialized fields.

Dramatic evidence of titanium's heat resistance, for limited intervals, is this photo of three test strips of titanium, stainless steel type 302, and 24ST aluminum alloy. All were exposed to 2000°F. flames. The aluminum alloy disintegrated in 30 seconds. The titanium strip showed less effect than the stainless steel after 30 minutes in this fiery blast.



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No. 40 Compound for Stainless Steel • Mac
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there is a pre-tested and proved Macco
compound that will enable you to do the job better
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Cost reduction of stampings by cost analysis methods

effects of cost reduction in relation to business progress and survival, where to look for cost reduction, and qualifications for a cost reduction engineer

PART II

by *James M. Seake* • PRESIDENT, THE LEAKE STAMPING COMPANY, MONROE, MICHIGAN;
AND FINISH TECHNICAL CONSULTANT

THE makers of end products usually have their own cost reduction men whether they make their own stampings or buy them on the outside. The manufacturers are in a position to profit in either instance, but more especially in the latter case. Progressive job stampers consider the cost-conscious customer a splendid opportunity for increasing sales.

Customers who are looking for savings are in a far better position to recognize savings when these are laid out in full view. It only stands to reason that a vendor who is familiar with every approach to a problem through years of experience has much to offer a firm limited to a narrow range of products.

This accumulated experience represents part of what the pioneering stamping firms have to sell. This represents an investment in "blood, sweat and tears". Very few suppliers are selfish with this information. But in all fairness, this sharing entitles fair consideration on the part of the customer.

A suggestion for appliance and metal product manufacturers

If you plan on making the part with the assistance of a vendor, he would appreciate knowing it, and perhaps will still be as liberal with his suggestions. If you plan on buying it on the outside, he will expect you to give others the same opportunity that you give him. However, if his design saves you money and appeals to you, remember his contribution of an idea that has been helpful to your firm.

In normal times, firms that make end products often find lagging sales. This may be the result of a competitor's lower prices. At such times the order is given to reduce costs by a certain percentage in order to restore normal sales volume. With proper cooperation, many firms welcome the opportunity to help attain this goal. There is a place for everybody in this complex industrial system in America.

Customers who buy stampings should select vendors with the most to offer. They should be chosen for their ability in the line of knowing the best methods of reducing costs. They should be familiar with the type of part a vendor produces. They should know the type of equipment a vendor has. There are many ways a source can help its customer, and also a customer can often help a vendor to their mutual advantage.

Where to look for reductions in stamping costs

Cost estimating is pre-production cost accounting that must be based upon the all-around experience of the estimator, after careful consideration of all known and probable factors that will affect the cost of producing a product. A cost estimator must be able to figure not only a cost that will leave a profit for the producer but also a price that will be sufficiently low to receive the order against competition.

This requires an extensive knowledge of the operations under consideration. An estimator's figures must be based on the same cost for-

mulas that the accountant will apply in assembling later production costs. An estimator must be familiar with the special character of his shop, which includes its shortcomings as well as its proficiencies.

Basic reasons for cost variables

Different firms may consider the same basic elements of cost, but seldom will you find their proportions alike. In the matter of investment, one plant may produce as much as another with one-fourth of the investment. Another plant may produce four times the volume with the same amount of labor. An older firm may have written off all of the investment, and a younger firm may have to pay interest on borrowed capital.

All of these variables influence the choice of a formula for estimating and cost accounting. Even after a formula has been determined by the most scientific reasoning possible, its success is entirely dependent on the practical application and sound judgment of the estimator. Costs records are necessary in many ways, but should not be overlooked as an aid in cost reduction and as a guide in estimating.

Raw material as a cost reduction factor

Perhaps the major elements of costs present the best opportunities for reduction of costs, but the minor items must not be overlooked. In the job stamping industry *material* is a sizeable portion. Every effort should be made to keep raw material inventory in proper balance. It is neces-

sary that material turnover cycle be held to a minimum. The range of sizes should be limited to as few variations as possible.

Care must be taken to prevent raw material from being damaged in handling. Material must not be wasted in process or by spoilage. Costs in this respect must be accurately kept so that costs may be reduced. Unless great care is exercised a job stamping firm will find that material purchased for a specific purpose may become obsolete by design changes or cancellation of orders.

Sometimes costs may be reduced by altering the outlines of products to permit maximum efficiency in the use of materials. Often proper stiffening ribs will permit the substitution of cheaper metals or thinner gauges of the same material without sacrificing the required strength.

Another possibility of reducing costs may be found in reducing the turnover of employees. Classifying the labor costs resulting from delays

in production may furnish the means for cutting costs. Another item of expense that should be avoided is the cost of training newly hired workers. Of course, it is hardly necessary to mention the value of time and motion study in searching for losses due to improper planning and inefficient production.

Cost record analysis of machine operations

The efficiency of machine operations may be improved by a careful analysis of cost records. One offender is the idle machine time that could be better utilized by better planning and production control. The substitution of faster automatic machine operations for the slower manually operated machine is a distinct possibility for savings in costs in many instances.

Keeping indirect non-productive labor in proper balance with other costs is a point that many overlook. Power, heat and light are some items

of burden expense that could well be considered in every assault on high costs. Depreciation is another element of cost that should be analyzed and set up in a manner calculated to give a realistic picture of the true value of production equipment. A careful analysis of insurance may disclose that a change in policy might provide a better coverage without any increase in cost.

Packing costs a factor

If production costs are made excessive by inefficient quantity releases, the job stamper may often get permission to increase the quantities produced with each new set-up of the job. Even in the method of packing many methods be found that will save the customer money in the choice of a container and the efficiency of the packing operation.

You might be pleasantly surprised if you checked cost records for the alternate methods of assembly and find that a cheaper process might offer some advantages without adding to the cost of the product. Cost records will often disclose the waste that may be attributed to unnecessary premium payments for overtime.

Material handling and maintenance as cost factors

The proper location of equipment to minimize material handling and the proper mechanical means for that task can prove to be fruitful points for research dedicated to the ideal of lower costs. Maintenance is a sufficiently important item of cost that it must be operated under a policy of anticipating trouble spots in advance, so that preventive means may be adopted prior to a breakdown.

Good housekeeping and orderly premises must not be overlooked in any concerted effort for reducing costs. Wholesome surroundings have a healthy influence on creating an atmosphere conducive to maximum results. A slovenly environment is most likely to lead to haphazard results and often reflects the confusion attendant in the other phases of the operations.

Adapted for *finish* from an address before the Pressed Metal Institute's 1952 Technical Meeting.



New plant born of market study

describing a new plant which was built in Oklahoma following a thorough study of the country's industrial facilities and marketing areas

by Walter Rudolph

SOUTHWESTERN Porcelain Steel Corporation, an Oklahoma firm, has been operating an expanding plant at Sand Springs (in Tulsa industrial area) for three years. Though comparatively small, this plant is perhaps a unique example of foresight and planning upon the part of its aggressive founders. Facilities are modern, and are devoted to the manufacture of porcelain enameled signs, architectural porcelain, and other associated items.

Background data on this firm is interesting and inspirational, as it forms a good case history of what can be done in the porcelain enameling field. First, let's consider the plant officials:

J. P. Wilhelm, president, was formerly vice president and treasurer of Moore Enameling & Manufacturing, West Lafayette, Ohio. The size of that operation is indicated by the fact that during World War II, it employed 1200 persons, manufacturing 105 mm. cartridge cases, 40 and 57 mm shots, 60 mm mortar shells, bomb fins and other metal items.

Vice president is John S. Lauder, a Navy veteran with years of experience in sales and engineering capacities in general manufacturing.

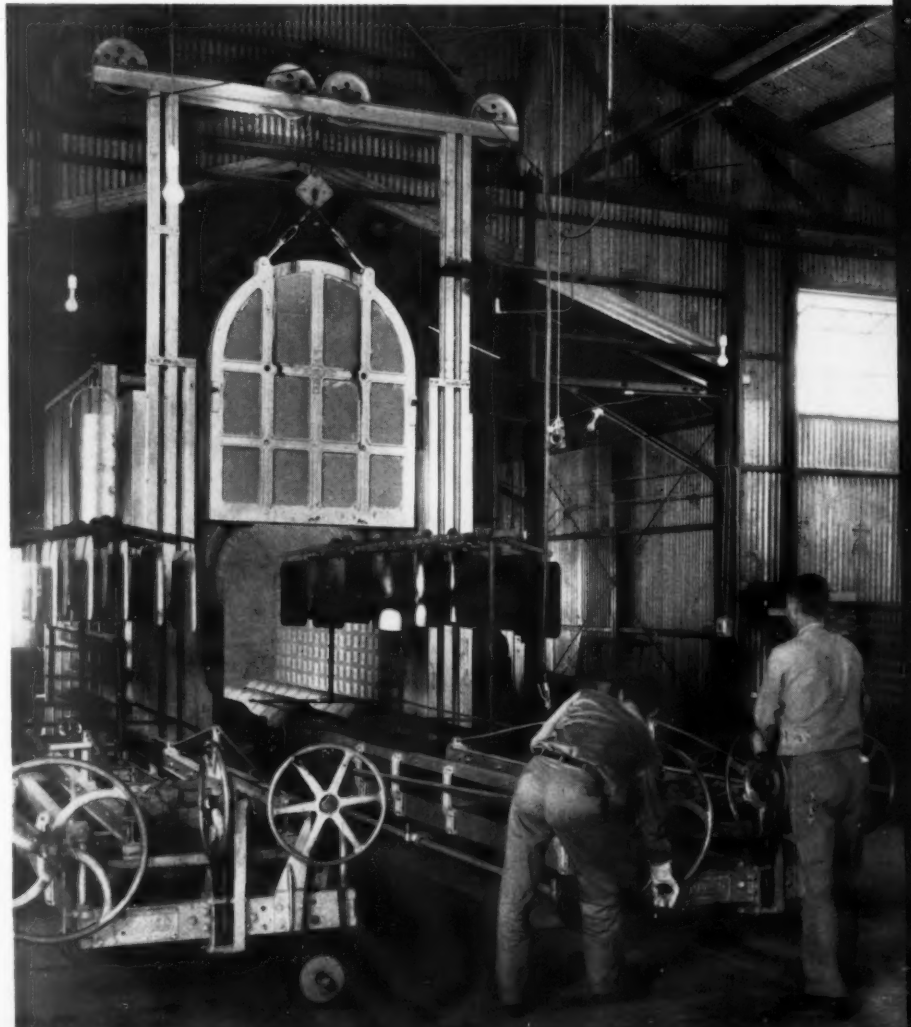
Close to 40 years experience in factory management, in sheet metal and

finishing operations, is the background of George Greene, factory superintendent, formerly with General Porcelain, Chicago.

George Cross, metal and tooling department foreman, is a qualified tool designer and die maker, with aircraft tooling experience gained

at Douglas, North American and Spartan.

Here is a well-balanced group of men knitting together in an operation that was planned from the start to fill a neglected niche in the porcelain enameling field. Basically, the \$150,000 corporation was founded in line



View of a 5x12' box-type gas-fired furnace. The fairly light, corrugated steel siding and steel frame construction of the building can be noted.

finish JUNE • 1952





Plant view showing zig-zag conveyor, mill room (rear), drying tunnel (right), and some handling facilities.

with the modern knowledge in industry that the location of any factory in a good marketing area is half the battle, and more, for survival.

Strategic location

The Tulsa industrial area is strategic for several reasons, primarily of course (as regards porcelain enameling) because of the vast potential in sign jobbing and sign sales. Tulsa, labelled the "Oil Capital of the World," concentrates the majority of oil companies, or their representative offices, within its boundaries.

Wilhelm pointed out that this, and other factors, were long considered when Oklahoma, and finally Sand Springs, were chosen for the location of the state's (and one of the southwest's few) first porcelain enameling plant. A study of the entire country's industrial facilities and marketing areas was undertaken before the decision in regard to location was made.

The precise location of the plant takes advantage of good railroad sidings and excellent trucking services. It was also considered that a high class of working people, many owning homes, were available, many within walking distance.

Plant expansion according to plan

Aside from the market study and hence strategic location of the plant,

perhaps the second most important physical factor is this "case history" is its excellent plant layout and facilities, or equipment. It was not all developed overnight. Buildings have been expanded (from a master or growth plan) from 25,000 square feet, to some 350,000 square feet.

Construction is all-steel framing, etc. (corrugated steel siding and walls), and concrete flooring — ideal for the particular climate of the region. Plant dimensions are 240 x 144 feet, with length running east and west. Departments and work flow runs from east to west, with offices at the latter end.

Fabrication, metal storage and welding areas open upon cleaning and pickling, and screening areas, reducing materials handling to a minimum. From the exit ends of the pickling and screening rooms, ware flows into the largest department, housing three sub-flow lines — enameling, brushing and drying lines — all of which impinge upon the charging and box furnace area on the far west of the plant, and a straight-through furnace on the north side.

A modern mill room, with a mezzanine slip storage area, is in between the department of fabrication, screening and pickling, near the east end of the plant, all of which are handily served by railroad siding. Art and

shipping departments are adjacent to the offices.

Cooperation with tooling and marketing organizations

Another practical consideration of this aggressive young firm is a working agreement with Interstate Tool and Die Co., Tulsa, who makes tools, dies and jigs for Southwestern. There is no financial tie-up, but both firms operate as one, each depending upon the other for certain operations. Southwestern is thus able to expedite many jobbing and other orders.

Finally, we might point out that in addition to well-trained and responsible key personnel, Southwestern has hired a majority of men and women who are readily adaptable to many types of operations within a plant of this kind. They have schooling or training as die and jig builders, electricians, inspection and assembly workers.

This organization shows unusually fine planning and conception from the word "go." It's a porcelain enameling operation with its eye to the future.

The plant's marketing of architectural porcelain is done exclusively through Howard Michel, Tulsa, operating as Porcelain Enamel, Inc. (formerly Porcelain Enamel Specialties, Baltimore, Md.).

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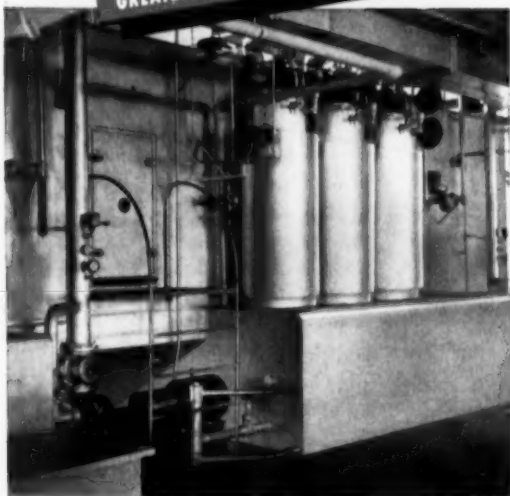


Interior view of one of the Mahon Hydro-Filter Spray Booths at Mullins Mfg. Corp. Note the "Hydraire" Flood Sheet which provides better air circulation within the booth and thereby greatly improves working conditions.



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MAHON

Synthetic resins for industrial finishes

Part II — systems containing alkyd resins

by William von Fischer •

HEAD, DEPARTMENT OF CHEMISTRY AND CHEMICAL ENGINEERING,
CASE INSTITUTE OF TECHNOLOGY, CLEVELAND, OHIO

"ALKYD resin" is a term that characterizes generally a wide variety of synthetic resins, resins which the chemist calls polymeric esters and which can be derived by reacting polybasic organic acids (i.e., organic molecules having two or more acid-reactive groups per molecule) with organic polyols (i.e., alcohols having two or more hydroxy groups per molecule).

Practical alkyds are based on acids such as phthalic, maleic, adipic, sebacic and many others. The alcohols are usually glycerol, pentaerythritol and sometimes glycols. By far the greatest part of alkyd resins use phthalic anhydride and either glycerol or pentaerythritol as the alcohol. Pentaerythritol became commercially important only in recent years, and alkyds which utilize it are frequently referred to as P.E. or penta alkyds to distinguish them from the traditional glycerol-alkyds. Very few, if any, useful alkyds can be made from, say, polybasic acid and polyols as the sole reagents. Nearly all coatings types resins contain what the resin chemist calls monobasic acid modifiers. These modifiers can be such things as the acids from vegetable drying oils; the acids from vegetable non-drying oils; rosin acids, and even synthetic acids such as benzoic or para-tertiary butyl benzoic acids. The simplest types of alkyds differ among themselves largely in the per cent of phthalic anhydride, and in the choice of modifiers. The number of possibilities for different alkyds is very large, and therein lies the major advantage of alkyd resins.

By proper choice of materials and methods for putting them together, the chemist can prepare a great va-

riety of resins, which can be classified roughly into the following groups:

ALKYD RESINS, OIL-MODIFIED

Oxidizing (air-drying types)

Alkyds that cure at room temperature by virtue of the fact that they contain some drying oil acids as modifiers. These are called oxidizing alkyds. Literally hundreds of varieties are available commercially, in which there is a variation in properties such as speed of dry, hardness, flexibility, exterior durability, color retention, etc.

Non-oxidizing types

The second group of alkyds contain as modifiers only such acids which cannot cure at room temperature, and frequently cure only to a limited extent at baking temperatures.

These resins are called non-oxidizing alkyds. They cannot be used except when they are mixed with other resins. This is not to imply that oxidizing resins cannot also be mixed with other resins. Alkyd resins of all classes are widely compatible with many useful synthetic resins other than alkyds, and this is one of their principal virtues. However, non-oxidizing type alkyds, which do not involve drying oils chemistry in their manufacture or use, have certain important properties which distinguish them from oxidizing types. The most notable being greatly improved resistance to yellowing.

If alkyd resins existed only as single vehicles, their properties would have merited a very large volume use, at least in industrial finishes. Alkyds can be designed which reproduce or

Experimental proportions of several materials used in the synthesis of an alkyd resin for fast drying primers and enamels.





PHOTOS COURTESY CASE ORGANIC COATINGS RESEARCH LABORATORY

Laboratory bench size unit for experimental work on manufacture of alkyd resins. A great variety of different resins can be made by altering proportions and manufacturing schedule using only the limited number of materials shown on preceding page. Many experimental trials are necessary to set up a tentative formula for an alkyd having specific practical properties.

improve the properties of nearly all of the old types of finishes which in years past were based on varnishes and oils. In as far as industrial finishes are concerned, however, their greatest success has come from the fact that their existence made possible the use of many synthetic resins which otherwise could never have been used in practical finishes. Paint films from these blends of alkyds and other resins possess protective properties that surpass by far anything that can be obtained with alkyds alone. What is equally important — the presence of alkyds in these resin mixtures allows for the attainment of standards of quality in decorative properties that cannot be matched with any of the old type of varnish finishes, and by very few of the new resin finishes which do not contain alkyds. Moreover, such alkyd containing resin blends allow for a wide variety of adjustment in techniques and schedules of paint application.

There is no doubt that the primary credit for the existence of modern decorative industrial finishes should go to those who developed and improved alkyd resins.

RESIN MIXTURES CONTAINING ALKYDS

The versatility of alkyd resins as carriers for other synthetic resins comes from the fact that these resin mixtures can be produced in a variety of ways, for instance:

Two-component mixtures

Alkyds plus phenoplasts — These systems have greatly accelerated curing rates on either air-drying or baking. However, the color retention of films produced is poor, therefore these are restricted to dark finishes, as were the old-fashioned oil varnishes. Their greatest importance comes from their use in undercoats, particularly undercoats for lacquer systems.

Alkyds plus aminoplasts — While the alkyd in these is present in great

est proportion (60-80%), the finishes are usually referred to as urea or melamine resin finishes. Urea or melamine resins cannot be used alone because of their poor film properties. Recent theory holds that resins in this type of mixture react with each other in the paint baking operation to yield an entirely different resin having properties superior to what could be obtained by using either constituent alone.

Where the ultimate in whiteness retention is a premium, the alkyd used is ordinarily of the non-oxidizing type, this is the situation for many *white home appliance finishes*. Where color retention is less important, oxidizing alkyds are used because it is easier to formulate more economic finishes which are more durable. The latter group is exemplified in our *automotive baking enamels and undercoats*.

The number of commercially available urea or melamine resins is rather limited. Probably no more than a dozen different types exist, and the range of variation of film properties in urea and melamine resins is rather limited. The great range of different properties in different types of urea or melamine resin finishes comes from the use of a great variety of alkyds with which the aminoplasts can be blended.

Alkyds plus nitrocellulose — Modern air-drying lacquers of the nitrocellulose type are competitive with baking enamels in respect to decorative and protective properties. This would not have been even approximately true if alkyds had not been developed. Modern nitrocellulose finishes contain at least as much alkyd resin as they do nitrocellulose. Almost universally, non-oxidizing alkyds are used in these in order to maintain film durability. (Oxidizing alkyds, when they cure, would tend to separate from the nitrocellulose in the film, causing alligating or checking or embrittlement of the film.) Alkyds are the ideal plasticizer for nitrocellulose and their existence has allowed the use of more durable types of nitrocellulose. The growing prominence of hot-spray techniques may allow even greater versatility in the

design of alkyd-nitrocellulose finishes for either greater economy of application or even for greatly improved properties.

Alkyds plus chlorinated rubber—Some success has also been achieved with blends of oxidizing alkyd and chlorinated rubber to give air-drying finishes of superior durability. Such finishes have found greater use in maintenance finishes than they have as production coatings.

To summarize, alkyd resins have the following advantages, either when used alone or in blends with other resins to produce industrial finishes:

1. Excellent decorative properties—a wide range of color and luster can be obtained.

2. Great versatility in paint formulations—whole paint systems including undercoat and topcoats can be designed, using different categories of alkyd or alkyd-mixed resin finishes. Hence, from the viewpoint of dominant resin composition, a multi-coat paint system can consist of closely related materials. This homogeneity is highly desirable in promoting durability, principally because of the good adhesion of multiple coats to each other.

3. Alkyd base finishes can be adapted to a great variety of application conditions, e.g. spraying, dipping, roller coating, brushing, air-drying, low temperature baking, high temperature baking, etc.

4. As compared to other synthetic resins, alkyd finishes are less sensitive to variable quality in metal-surface preparation. (In this respect, however, they are not nearly as good as the old-fashioned varnishes.)

Now, what are the disadvantages? The major disadvantage is inherent in the chemical structure of alkyds—these resins are polyesters, and the ester linkage is sensitive to hydrolysis or decomposition by water, particularly in the presence of acids and alkalis. This chemical weakness of the resin limits its capacity for long-term corrosion protection. To the extent that the proportion of alkyd in a mixed-resin film is reduced, the protective properties can be augmented or reduced, depending on the chemical stability of the diluent resin.

Three-component system

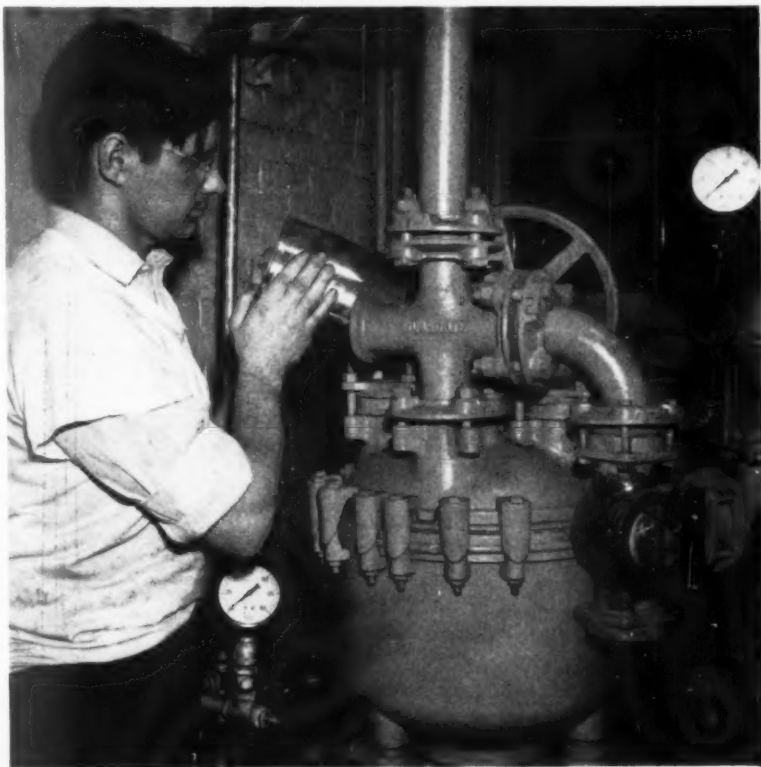
The limits of dilution of alkyd with nitrocellulose, urea or melamine resins is limited if resins are combined by the conventional blending procedure in paint formulation. Hence, in recent years, considerable attention has been given to changing the alkyd resin by modifying it so as to reduce its content in chemically weak ester linkages while at the same time trying to maintain enough of the old structure to preserve the good features we associate with the use of alkyd finishes. To explain this further, consider the traditional system, in which we have constituents A and C, where A, for example, is a conventional alkyd resin, and C is either an aminoplast (i.e., a urea or melamine resin) or nitrocellulose. The probable limit of blends of A and C is something like 50/50, which means at least half the resin composition is less resistant to chemical deterioration, but, nevertheless, it is necessary because we want to preserve the advantages we have enumerated. We do not need 50 per cent of A to pre-

serve these advantages, however, if we increase markedly the proportions of C, film properties are lost.

Suppose that we want to reduce proportions of A by adding a third constituent B, which is equal or superior to C in durability. Then we would have a blend of A, B and C—a three component mixture, possibly in proportions 1/4, 1/4, 1/2. We still preserve to a large extent the advantages of A, but our protective properties increase. Such adducts B are known. For example, epox resins can be so incorporated, and some vinyl resins also. However, this approach is rather limited. It is very difficult to find third components, B, which can be substituted by blending for part of A in the original AC combination without degrading rather than improving film properties.

Compatibility between mixtures of two types of synthetic resins is rare—for the existence of good film forming three component blends, which can be obtained by mixing, are so rare as to be occasional exceptions. Of such systems, the alkyd, epox,

Pilot plant unit for the manufacture of resins. Tentative alkyd formulas are studied here to determine the feasibility of production in similar 1000-5000 gallon commercial reactors.



aminoplast blends, have in the last year provided a notable contribution to the industrial finishing field, particularly where nearly white finishes of considerable alkali resistance are required. The features which have limited their more general use have been a tendency for yellowing on baking, some problems of package stability, requirements for greater care in cleaning metal (and this nearly always holds when the proportions of alkyd is reduced in a finish), and increased cost as compared to alkyd-melamine finishes which are otherwise equivalent in appearance and film properties except for resistance to deterioration by alkali and strong detergents. Some baking enamel and even nitrocellulose lacquer systems have been proposed in which part of the alkyd is replaced with certain vinyl resins. Finishes of notably improved weathering resistance can be prepared this way. However, cost considerations probably have thus far

limited much use of finishes of this type.

ALKYDS MODIFIED BY CHEMICAL REACTION WITH OTHER RESINS

As mentioned before, alkyds can be mixed with other resins to make possible coatings of very superior properties which in large measure preserve the decorative and easy application properties of alkyd resins alone. The weakness of all these systems is that they must contain large proportions of alkyd and hence there is a limit to what can be achieved in durability of the film because the alkyd portion has only limited chemical resistance. Only partial and occasional success has followed from attempts to decrease the alkyd ratio further by dilution blending with other more flexible resins. However, resin chemists have found that the desired results can be accomplished by reacting other types of resins with the alkyd, to get a *chemically modi-*

fied alkyd in which the alkyd part of the resin is greatly reduced and hence film durability is improved. In this case, in contrast with straight solution blending procedures, these low alkyd content mixed resins still preserve many of the desirable properties of ordinary alkyds. A great number of such chemical modifications are possible—of recent date only two have achieved commercial importance—these are:

Styrenated alkyd resins

These resins, like normal alkyds, contain drying oil acids, glycerol and phthalic anhydride in their composition. In addition, however, anywhere from 20 to 60 per cent of the resin is made up of polymeric styrene. Introduced so as to make a useful coatings composition of the alkyd-styrene resin. The addition of the styrene to the alkyd promotes flexibility, weathering resistance, and to

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USEFUL COMPOSITION RANGES OF MIXED RESIN COATINGS VEHICLES THAT CONTAIN ALKYD RESINS

RESIN TYPES MIXED OR COPOLYMERIZED WITH ALKYD	EXAMPLES OF TYPES OF INDUSTRIAL FINISHES	10	20	30	40	50	60	70	80	90
		90	80	70	60	50	40	30	20	10
1 NO MODIFICATION	AIR-DRYING AND BAKING ENAMELS AND UNDERCOATS FOR METAL									
2 AMINOPLAST	UREA OR MELAMINE TYPES OF HIGH-BAKE WHITES FOR HOME APPLIANCES, WHITE TILE BOARD, ETC.									
3 AMINOPLAST	UREA OR MELAMINE TYPES OF BAKING UNDERCOATS FOR AUTOMOBILES, APPLIANCES, TILE BOARD									
4 AMINOPLAST	UREA OR MELAMINE AUTOMOTIVE AND MACHINERY ENAMELS									
5 PHENOPLAST	AIR-DRYING AND BAKING ENAMELS AND UNDERCOATS FOR ENAMELS OR LACQUERS									
6 NITROCELLULOSE	AUTOMOTIVE AIR-DRYING LACQUERS									
7 STYRENE	FAST AIR-DRYING ENAMELS, ESPECIALLY HAMMER FINISHES AND AMMUNITION ENAMELS									
8 SILICONE	MORE DURABLE AIR-DRYING ENAMELS									
9 SILICONE	HIGH-TEMPERATURE RESISTANT BAKED ENAMELS									
10 CHLORINATED RUBBER	AIR-DRYING ENAMELS FOR EXPOSURE TO WATER AND HUMID OR ACID ENVIRONMENTS									
11 EPOXY	ALKALI RESISTANT HIGH BAKE WHITE ENAMELS FOR APPLIANCES	ALKYD AND AMINOPLAST AS NO. 2								
12 VINYL	FAST-DRYING, CHALK-RESISTANT, AIR-DRYING ENAMELS									

OR MODIFIED ALKYD

OTHER RESIN

RANGE OF USEFUL MIXTURES



Frankly admitted to be an airplane that will fly at supersonic speeds, this new Douglas bat-wing airplane being built for the Navy requires a hard, smooth, heat-resistant finish. It is obtained by using the hot spray method.

Hot spraying proves economical for aircraft finishing

by Gilbert C. Close • WESTERN EDITOR



Any process adopted in the aircraft industry must undergo months of critical and analytical testing before it is incorporated in the production line. It must meet with the approval of the Civil Aeronautics Administration, and must undergo additional tests and be approved by the Army and Navy procurement divisions. This happened to the hot lacquer spraying technique now in use at the El Segundo (California) Division of Douglas Aircraft Company.

In all the tests the new technique proved technically as good or better than cold lacquer application. From the economical standpoint, the hot spraying technique was way out in front. The same applies to fire and health hazard reductions.

As employed at Douglas, a metal-

enclosed steam heating coil is mounted on the pressure pot hose about two feet back from the spraying nozzle. Steam for the coil is furnished by a local boiler. As the lacquer passes through this heated hose section, it

Editor's Note:

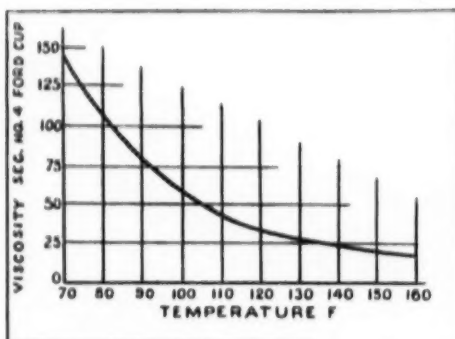
The hot spray technique for organic finishing has been covered in earlier issues of *finish*. When we learned that Douglas Aircraft Company had developed a very successful technique for finishing surfaces of the most modern aircraft, we asked Gil Close, Western Editor for *finish* (formerly in the Engineering Department of Douglas), to give us a story of this specific application.

is warmed to about 160°F. Some users of the new process have attempted to volume heat the lacquer while still in the paint pot, but this results in excessive loss of volatile contents.

According to E. D. Mitchell, Douglas process engineering paint technician, who developed the hot spraying technique in that plant, the most obvious although not the greatest saving results from the use of less solvent. The heat lowers the viscosity of the lacquer and less thinner is required. When hot spraying, about 2½ parts of thinner to 3 parts of package material is used. In cold applications, using the same lacquer, five parts of thinner to four parts of package material must be used. This represents a saving of nearly 50 per cent in the amount of thinner used.

Film thickness characteristics

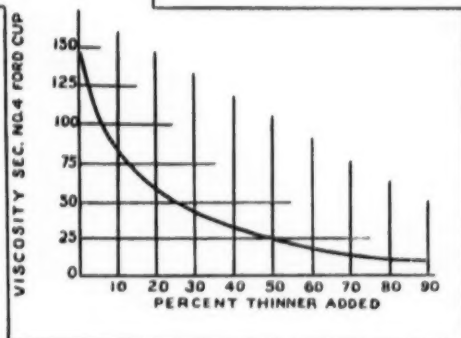
Several technical advantages accrue from using less solvent. The hot spray operator is able to apply a higher solids film with less material loss due to fog and overspray. A given film thickness can be built up in fewer coats due to this high solids content as there is less volatile sub-



Application of aircraft finish by the hot spray method.

Left: Effect of heat on the viscosity of a 52L26 lacquer.

Right: Effect of thinner on viscosity of a 52L26 lacquer.



stance to evaporate and thus reduce applied film thickness. In this conjunction, two wet cross coats applied cold yield a dried film thickness of approximately 1.5 mils. The same film thickness can be obtained with a single wet cross coat using the hot spray method.

A considerable time-saving advantage accrues at this point. When an ultra-smooth finish is required and the cold two-coat application system is used, the surface must be sanded smooth between coats. In using the hot spray method and single coat application, one complete sanding operation is eliminated.

It is thus evident that direct savings are realized in the following ways—less thinner is used, there is less loss of lacquer due to overspray, and the one wet cross coat hot spraying system cuts in half spraying time and sanding time over the two-coat cold system.

Increased production per unit of equipment

Indirect savings accrue from increased production without increasing equipment. Mitchell points out that when the hot spraying technique is in full use at the Douglas plant, production will be approximately doubled without increasing present

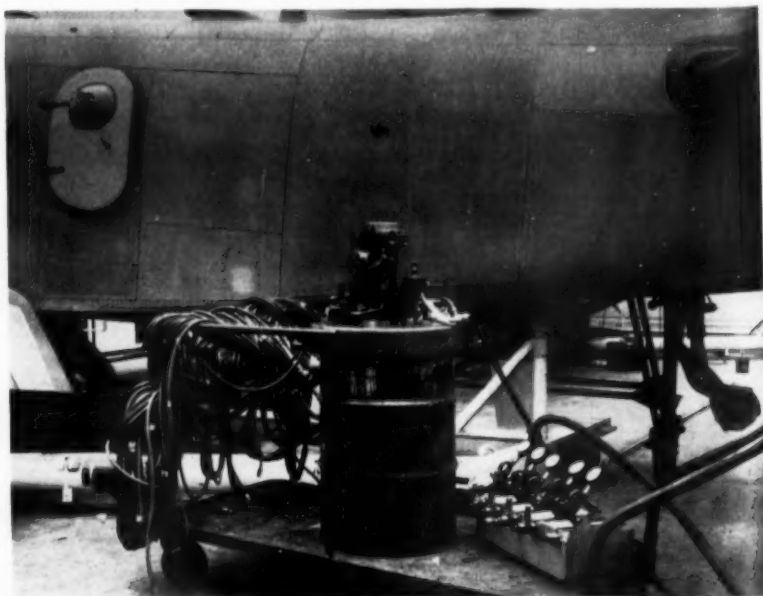
equipment. Also, due to less solvent content, the hot sprayed film dries much quicker than a film applied cold, requiring only from five to ten minutes. "This quick drying results in less dust pick-up, a smoother film, and fewer parts rejected for stripping and repainting," Mitchell says. "Sanding to remove foreign particles and subsequent touch-up work is reduced to a minimum."

From the quality standpoint, all tests conducted at Douglas proved the hot sprayed film to be equal to or better than films applied cold. Not once in numerous salt spray tests and hardness and abrasion resistance tests did a cold film prove to be better. Mitchell attributes this superior quality to the lower percentage of solvent which must be driven off during drying. This results in less film porosity and increases its resistance to penetration by moisture and oil. There is also less film shrinkage during drying, with less stretch-thinning and rupture over minute surface protuberances, rivet heads, screws, etc.

Due to its higher solids content, the hot film has better "flow out" characteristics than films applied cold. There is also much less tendency for this heavier film to sag. Blushing is entirely eliminated. "In areas having high humidity, blushing is a major problem," Mitchell says. "Moisture condenses on freshly sprayed lacquer as it is cooled by the rapid evaporation of its solvents. This condensation causes the film to become cloudy. When lacquer is sprayed hot it is almost impossible to produce blushing due to the film's quick drying and lack of volatile substances."

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Complete hot spray unit — steam generating unit at right on front of cart.



The use of phosphors in vitreous enamels

a report of an investigation in the field of luminescent enamels

by *Harold P. Cahoon* • DEPARTMENT OF CERAMICS, UNIVERSITY OF UTAH, SALT LAKE CITY

LUMINESCENT enamel could have wide application, especially the long persistent phosphorescent type. This material could be used to advantage in various kinds of signs since being embedded in an enamel it would be protected from weather and would give long life to the luminescent article. The cost of such enameled ware would be equivalent to that of ordinary enameled ware except for the cost of the luminescent material added.

The commercial possibility of such a product made this investigation desirable.

Review of the literature

The literature reveals that little effort has been spent to develop luminescent enamels. Most of the information available is in patents and the majority of these are held in foreign countries. The idea is not a new one, for, in 1903, B. G. Kodjbanoff received a U. S. patent for incorporating luminescent material in enamels.¹

Patent information which is available usually states that an enamel is prepared containing luminescent powder. The mixture is fired in the usual manner. Restrictions are placed on the kind of materials that must be present in the enamel preparations. This list of restricted components varies greatly, but lead is excluded in most cases. The luminescent powder is generally specified to be a sulfide; zinc sulphide is mentioned most frequently. The temperature for firing, when specified, is below 850° C.

A variation in application was accomplished by Schrimme and Kaiser² who applied two layers of lumines-

cent substances with a glaze between. One luminescent layer activated the other.

Plan of investigation

The problem of producing a luminescent enamel appeared to be four fold, namely: (1) The selection of an enamel which would transmit ultraviolet light or sunlight easily. (2) The selection of an enamel that would not dissolve the luminescent material or react with it. (3) The selection of an inorganic, thermally stable phosphor of desirable characteristics. (4) The determination of the best method of application of the enamel.

The fourth problem was investigated first. The difficulties encountered in applying phosphors to a commercial enamel would indicate the direction of future investigation. Only commercial enamels were used and no special enamel, such as mentioned by Leverenz³, was considered.

Raw materials

Commercial frits and clays were obtained from the Ferro and Pemco Corporations. An under coat, leadless opaque, and leadless clear cover coats listed in Table I were obtained from both companies.

The luminescent materials consisted of scheelite (CaWO_4), willemite (Zn_2SiO_4), magnesium orthotitanate activated by manganese (Mg_2TiO_4), and Lumanize⁴ #324. The scheelite was a natural high grade concentrate, and when excited by ultraviolet light was a light blue color. The willemite was hand selected from willemite ore, and when excited by ultraviolet light was a bright light green color. The

magnesium orthotitanate was prepared as suggested by Kroger⁵ and when excited by ultraviolet was a dark red color. The Lumanize #324, according to the manufacturer, was a strontium zinc sulphide. This material was excited by ultraviolet or any bright light. The excited color was a light blue which could easily be seen after remaining several hours in a darkened space. Each material was ground to pass a Tyler 150 mesh screen. These four luminescent powders are representative of materials with widely different chemical characteristics and thus will reveal the different problems which will arise in this application.

Preparation of enamels

The enamel compositions, given in Table II, were prepared in 1000 gram batches and ground to a fineness of 1-5 per cent residue on a 200 mesh screen. →

HAROLD P. CAHOON



Metal preparation

Low carbon 24 gauge sheet steel was used for all enameling. Test plates 2" x 1½" were cut from the stock. The steel was cleaned (as recommended by Andrews⁶) as follows: (a) cleaning in boiling sodium hydroxide solution; (b) rinsing in warm running water; (c) pickling in cold hydrochloric acid solution; (d) rinsing in warm running water; (e) neutralizing in hot sodium carbonate solution; (f) drying in a warm stream of air.

Enamel application

The enamels and luminescent powders were applied by four separate methods to 1½" x 2" test panels of 24 gauge enameling iron:

1. Spraying the mixture of luminescent powder and cover coat onto the fired ground coat.

2. Sprinkling the dry luminescent powder onto a green wet cover coat.

3. Spraying the opaque cover coat onto the fired ground coat, over which the luminescent powder was

dusted and then sprayed with a clear cover coat.

4. Dusting the mixture of dry enamel and luminescent powder onto

Editor's Note:

This article, which should be of special interest to manufacturers of signs, dials, name plates etc, represents the second prize winning paper in a Ferro Corporation Contest for the best student papers on porcelain enameling.

The author completed his undergraduate work at the University of Utah, following four years in the Marine Corps. In 1950, he received his Master's degree in ceramic engineering from the University of Washington where he held the Edward Orton Jr. Research Foundation Fellowship. He is presently working on an Office of Naval Research project while pursuing his Doctor's degree at the University of Utah.

the ground coated metal sheet which had been dipped into a solution of methyl cellulose.

The firing temperature and time for each enamel is given in Table III.

The percentage of luminescent powder in the enamel was varied from 10,

20, to 30 per cent in each application mentioned before.

Testing

Testing consisted of visual inspection of the enamels and exposure to ultraviolet light from a "mineralight" in a darkened space.

DISCUSSION OF RESULTS

Luminescent powder results in clear cover coat enamel

(a) Magnesium orthotitanate, when dusted on the enamel gave an intense red color when excited by ultraviolet light, but it lost all its ability to luminesce when mixed with or covered with an enamel.

(b) Willemite was not affected by any of the enamels and would luminesce whether covered by or mixed with a clear enamel. It luminesced a brilliant strong green under ultraviolet light.

(c) Scheelite was not affected by the enamels and acted the same as willemite except that its luminescence under ultraviolet light was much weaker and was light blue in color.

(d) Lumanize #824, when dusted on an enamel and heated, retained its phosphorescence, but when it was covered or mixed with an enamel it decomposed readily, causing violent bubbling of the enamel. Oxidizing and reducing atmospheres had little effect on its decomposition when covered or mixed with the enamel. Regardless of the duration of time the sample was allowed to remain in the furnace, this effect was observed unless the enamel had not matured. This suggests that a lower maturing enamel be employed with this material.

Luminescent powder results in opaque cover coat enamel

Luminescent powders mixed or covered with an opaque cover coat were completely masked. No luminescence of the powder could be observed. This was expected because of the low light transmission or high covering power property of these types of enamels.

Application results

(a) The mixing of a clear cover coat with a luminescent powder gave the most satisfactory results. The

Table I. Raw Materials

Frit Number	Purpose
2212	hard undercoat
2216	undercoat
2210	undercoat
2214	undercoat
2206	undercoat
2220	soft undercoat
1575	titanium opacified cover coat
1000	clear cover coat
Green label clay	medium set, high bubble
Black label clay	high set, low bubble
Red label clay	low set, high opacity
Blue label clay	low set, low opacity

Frit Number	Purpose
2042	hard undercoat
2043-A	medium undercoat
2099	soft undercoat
2133-A	zirconium opacified cover coat
2308	clear cover coat
M-7 clay	

enamel bubbled Lumanize #824 and with magnesium orthotitanate a matte cream colored enamel was obtained that would not luminesce. With scheelite, the enamel was smooth but luminesced weakly when exposed to ultraviolet light. Willemite, on the other hand, gave an enamel that was smooth and of strong luminescence when exposed to ultraviolet light. It was also interesting that when roughened with an abrasive, the enamel gave a brighter luminescence. Evidently, when the enamel is reduced in thickness more particles of luminescent substance are exposed at the surface. This would suggest that if an enamel that would more readily transmit ultraviolet light were used more particles would be exposed to excitation.

(b) The sprinkling of the luminescent powder on a green wet cover coat produced a sheet of enamel that did give strong luminescence. The difficulty was that exposed powders could be rubbed off by mechanical action. Each powder did retain its properties of luminescence. The powders arranged in order of increasing resistance to removal by mechanical action are as follows: magnesium orthotitanate, Lumanize #824, scheelite, and willemite.

(c) The process of spraying an opaque cover coat onto the ground coat, over which the luminescent powder was dusted and then sprayed with a clear cover coat, proved to be unsatisfactory. The layer of luminescent powder between the two cover coats prevented the forming of a good bond. This weakness caused the top cover to peel and pop off easily. This could be partly eliminated by firing the opaque cover coat and powder

Table II. Batch Composition of Enamels (Parts by Weight)

Enamel No.	2F	10p	1C	2P	20p	2C
Frits	40(2212) 40(2214)	100(1575)	100(1000)	60(2042) 30(2043A) 10(2099)	100(2133A)	100(2308)
Clay	3.5 (green label clay) 3.5 (black label)	4 (red label)	6 (blue label)	7(M-7)	6.5(M-7)	5.5(M-7)
Feldspar	5			5		
Borax	.75			.625		
Magnesium Carbonate			.25	.125		.25
Potassium Carbonate		.25			.25	
Sodium Aluminate		.25				
Sodium Nitrite	.25			.125	.125	.125
Water	45	42	.35	45	40	40

layers before applying the clear cover coat. Regardless of the method or amount of clear cover coat applied, it would cover the powder to such an extent that no luminescence occurred when exposed to ultraviolet light. This also suggests that the particles must be very near the surface of the enamel, or that the enamel must transmit ultraviolet easily in order to obtain a satisfactory luminescent product.

(d) The dusting of a mixture of dry enamel and luminescent powder on the ground coat showed no improvement over the wet method. Crawling was more prevalent with this method.

Percentage of powders in enamels

Where willemite powder was mixed with the enamel, an increase in percentage of powder increased the luminescence of the enamel. When a mixture consisting of 30 per cent willemite powder and 70 per cent enamel was ball milled, a good enamel, brownish in color, was obtained. When this mixture was prepared by mixing in a "Kitchen Aid," the enamel popped off the ground coat.

Thirty per cent of magnesium orthotitanate gave a very matte cream colored enamel. Decreasing amounts of magnesium orthotitanate reduced the matte finish but in no case did the

enamel show luminescence. Scheelite acted much the same as willemite, but the luminescence was weak even at 30 per cent scheelite. Lumanize #824, regardless of the per cent added to the batch, destroyed the enamel if the enamel was allowed to remain in the furnace until it became fluid.

Conclusions

The most satisfactory method found for applying a luminescent material to an enamel is that of mixing the clear cover coat and phosphor together in a ball mill and spraying onto a ground coat.

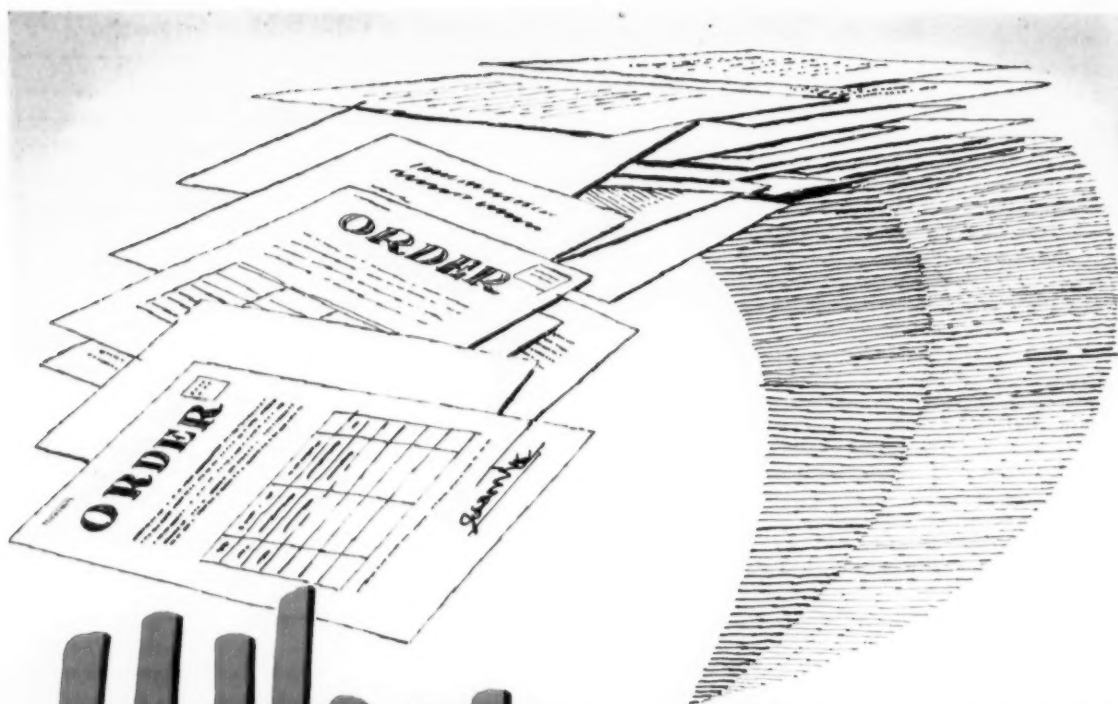
Luminescent efficiency of these enamels could be increased by the development of an ultraviolet transparent enamel.

Although willemite was found to yield the best results as a luminescent phosphor, many more inorganic phosphors are available and a rich new field is awaiting development. Many of these phosphors have useful properties as pigments in ordinary light.

1. Kodjibanoff, B. G., "Luminescent Material Incorporated in Inorganic Enamel," U. S. Pat. 899, 873, 9-29-08.
2. Schrimm and Kaiser, "Manufacture of Luminescent Panels," Fr. Pat. 897, 807, 6-12-49.
3. Leverenz, H. W., "An Introduction to Luminescence of Solids," John Wiley and Sons, Inc., 414, 1950.
4. Lunex Company, Davenport, Iowa.
5. Kroger, F. A., "Luminescence of Solids," Elsevier Publishing Co., Inc. 65-66, 1948.
6. Andrews, A. L., "Enamels," The Twin City Printing Co., 75-124, 1935.

Table III. Temperature and Firing Time of Enamels

No.	Temp. °C	Minutes
2F	850	2¼
1C	825	3
10p	825	3
2P	870	2
2C	820	3
20p	820	3



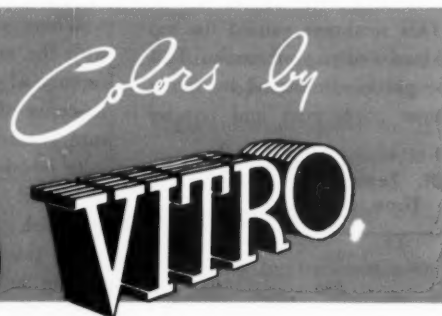
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Speaker's table at annual banquet of American Ceramic Society.

American Ceramic Society annual meeting

illustrated with finishfotos exclusively

A TOTAL of 2113 persons registered during the 54th annual meeting of the American Ceramic Society, held at the William Penn Hotel, Pittsburgh, April 27 through May 1. This compares with the previous high of 2074 registered at last year's meeting held in Chicago.

Cramer named president, Danielson president-elect

William E. Cramer, of Industrial Ceramic Products, Inc., Columbus, Ohio, was installed as president of the Society for 1952-53. Outgoing president was Howard R. Lillie, of Corning Glass Works, Corning, N. Y.

R. R. Danielson, of Metal & Thermit Corporation, Carteret, N. J., was named president-elect of the Society.

Vice presidents include: Haskell B. DuBois, of Consolidated Feldspar Corp., Trenton, N. J.; Harry H. Holscher, of Owens-Illinois Glass Co.; Toledo, Ohio; and Victor C. Swicker, of Alexander H. Kerr & Co., Inc., Los Angeles.

Edwin M. Rupp, of United Feldspar, New York City, was reelected treasurer. Charles S. Pearce continues as general secretary of ACS.

Enamel division officers

Officers of the Enamel Division include: Chairman E. E. Marbaker,

O. Hommel Fellow at Mellon Institute, Pittsburgh; Vice Chairman, Wayne Deringer, of A. O. Smith Corp., Milwaukee; and Secretary, Joe Richmond, of National Bureau of Standards, Washington, D. C.

Dr. G. H. McIntyre, of Ferro Corporation, Cleveland, was elected to a three-year term as trustee of the Enamel Division.

Finish editor named ACS fellow

Dana Chase, editor and publisher of *finish*, and active in affairs of the

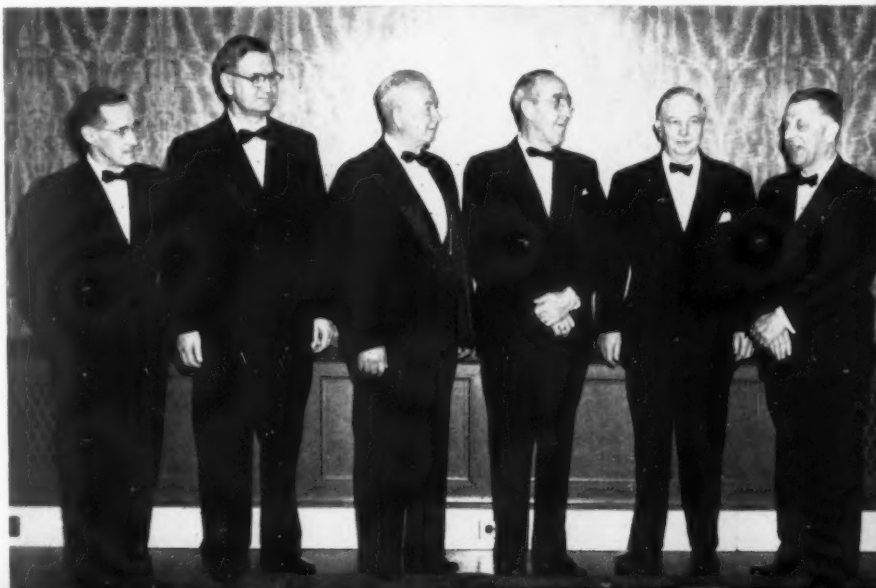
Enamel Division for many years, was named to the honorary post of Fellow of the American Ceramic Society. This honor, also bestowed this year on nine other Society members, is given in recognition of outstanding service to the industry.

Technical sessions well-attended

The technical sessions of the Society's divisions were well-attended. The packed Enamel Division sessions

More finishfotos →

ACS officers, left to right: H. B. DuBois, H. H. Holscher and V. C. Swicker, vice presidents; Edwin Rupp, treasurer; R. R. Danielson, president-elect; and William E. Cramer, president.





At presentation of Ferro awards: McIntyre, Humenik, Berg, Paulos and Bishop.

had lively discussions following presentation of individual papers. This indicated that the papers presented were of keen interest to those in attendance.

The Enamel Division drew attendance from all over the United States, as well as Canada, Mexico, France, Austria, Holland, Venezuela, and Argentina.

**Winners announced for annual
Ferro student contest**

Morris Berg and Michael Humenik, Jr., graduate students at the Massachusetts Institute of Technology, were awarded first prize of \$500.00 in the nation-wide contest in porcelain en-

ameling technology sponsored by Ferro Corporation. The award was made during an Enamel Division session on April 23.

The winning paper was entitled "A Contribution to the Theory of Enamel Adherences" and dealt with an evaluation of phenomena observed in the development of adherence of enamel to iron.

It was the third annual student contest sponsored by Ferro Corporation for the purpose of stimulating interest in porcelain enameling education.

"The papers submitted from students from all over the country were outstanding this year," commented Dr. G. H. McIntyre, Ferro vice presi-

dent and director of research. "Almost every contribution was outstanding and it was a difficult choice to select the winners."

Winner of the second prize of \$300.00 was Nick E. Paulos, an undergraduate student at the Georgia Institute of Technology, Atlanta. His paper was entitled "A Method for Studying the Resistance of Enamels to Abrasion by Rapid Moving Particles Suspended in High Temperature Flames."

The \$100.00 third prize was won by Stanley W. Niemezura, graduate student at Rutgers University, New

Photos taken during a meeting of the Enamel Division





Meeting of Coordinating Committee of District Enamellers Clubs.

Brunswick, N. J. The subject of his paper was "Changes in Thermal Expansion Curves Resulting from the Replacement of Sodium Oxide with Lithium Oxide in Acid-Resistant Enamel."

The fourth and fifth prizes, of \$50.00 each, were awarded to George J. Bishop III, of Clemson College, S.C., and E. C. S. Rao, of the University of Washington, in Seattle. Both are undergraduate students. Bishop's entry evaluated pyrophyllite as a constituent of coatings to afford oxidation protection to low carbon steel under high temperature operating

conditions. Rao's paper dealt with alkali-fluoro-silicate glasses as vitreous enamels.

The contest judges were Edward Mackasek, managing director of the Porcelain Enamel Institute, Washington, D. C.; Charles S. Pearce, secretary of the American Ceramic Society, Columbus, Ohio; and B. J. Sweco, director of ceramic research, Ferro Corporation.

Illini alumni honor Hursh

The annual dinner of the Illini Ceramikers, held the evening of April 23, honored Dr. Ralph K. Hursh, professor of ceramic engineering at the University of Illinois.

One hundred ninety-three alumni, faculty, students and wives assembled at the dinner. Dr. A. I. Andrews, head of the Illinois Department of Ceramic Engineering, reviewed the departmental activities and introduced members of the staff.

Dr. Hursh, master of ceremonies at the dinner, was presented with a handsomely bound volume of personal letters from alumni of the department by Fred S. Markert, Class of '24, vice president of Ferro Corporation, on behalf of all the graduates of the department.

"Among us tonight," said Markert, "we have a good friend, a credit to our school, the industry, and teach-





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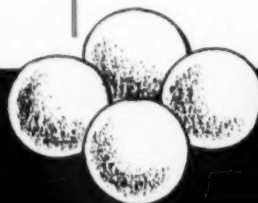
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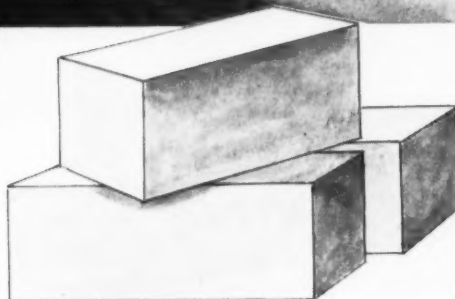
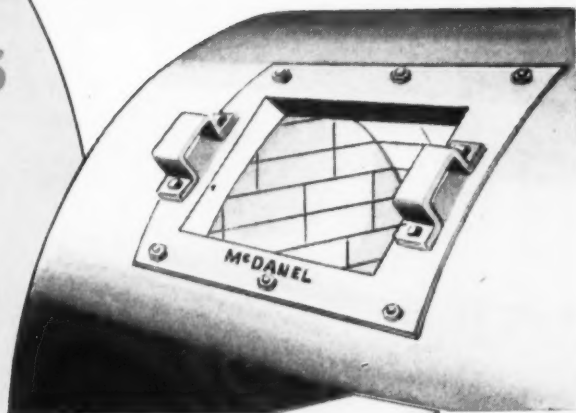
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During this full year's test the mill was lined half with regular McDanel Porcelain Brick and half with the new McDanel Super High Density Lining Brick. The new Super Grinding Ball was used throughout the test.

Both were installed at the same time. The difference in wearing quality by actual production grinding proved better than 2 to 1.

This new high density lining brick for all types of ball mill grinding comes in a complete size range to fit every size mill.



No. 1 shows regular McDanel Porcelain Brick at end of test.



No. 2 shows McDanel Super Brick at end of test.

These are unretouched photos — note cement sticking to back edge of bricks.

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ing profession. He is approaching the time of retirement. Not too old in years, but many in service. Some recognition by all of us who have benefited from his guidance seems only fitting and proper. . .

"A room has been provided in the Ceramics Building at the University of Illinois, and with the aid of our teaching staff, it is being well furnished with the proceeds of a special fund (subscribed by former students of Dr. Hursh). It should last many years, will be used by our students, and is available for bull sessions of visiting firemen, sometimes called alumni. A suitable ceramic plaque has been mounted on the wall, and this room will stand as a memo-

rial to the man we honor. . . In addition we have collected many letters of appreciation from our group, which we have bound for presentation tonight. These total 160," stated Markert.

Enamelers clubs coordinating committee meeting attended by men from Mexico, France

The Coordinating Committee for District Enamelers Clubs met Tuesday noon, April 29, at the William Penn Hotel, Pittsburgh. The four district clubs in the United States were all represented, as were a newly-formed French enamelers club, and a proposed ceramic association in Mexico.

W. J. Plankenhorn, chairman, outlined the history of the Committee since its first meeting held during the ACS meeting in Buffalo, in 1946. He outlined briefly the original aims and purposes of the committee, adding that meetings are usually held twice a year, during the Porcelain Enamel Institute annual shop practices forum in the fall, and during the American Ceramic Society annual meeting in the spring.

Andrew A. Yarte, of Productos Ceramicos, Monterrey, Mexico, reported that plans are being considered for the organization of a ceramic group in Mexico, and requested copies of bylaws of the four enam-

to Page 75 →

Finish candid camera photos of members of Enamel Division of American Ceramic Society.



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Ladies' Home Journal

To Finish:

White is white — until different manufacturers' products are grouped together. Blue white, gray white, yellow white — they all may be fine finishes in themselves, but they seldom are complimentary to each other. It would be a fine thing to have a standard white used throughout by manufacturers who make kitchen and laundry products.

Great strides have been made in improving white finishes. I know of manufacturers who go to great expense to match up whites throughout their line — although they represent different kinds of finishes. It would be another step forward to adopt a standard white to be used by many manufacturers.

Margaret Davidson
Associate Editor
Household Department

How white

additional opinion
dismissing and leav-
tion concerning

Today's Woman

To Finish:

This answers your letter inquiring about standardization of white in the kitchen.

Your editorial campaign in this direction is most commendable. The consumer will certainly benefit because the various shades of white that often occur is a serious problem in many instances. I appreciate the production difficulties involved, and wish you success in your editorial campaign.

Ruth Gaffney
Home Equipment Editor

Retailing Daily

To Finish:

Standardizing the white finish of home appliances is as important to the housewife as having the right matching job done on the finish of the family's new Cadillac which she has just rubbed against a tree. If the touch-up job isn't done right, if the colors haven't been matched right, the car will still run beautifully. But it will have lost a little of its value as a family display piece.

The same thing is true of new appliances, undoubtedly the best looking and most efficient ever built for the home. Today appliances are made to please the eye as well as to serve a function. If the white finish which predominates on most major appliances does not match from manufacturer to manufacturer, or even among the products of the same manufacturer, some of the lustre and glamor surrounding them today will be lost on the housewife when these appliances are placed beside each other in the home.

Standardizing white is important also, because it would be a major step toward standardizing other colors. . . . Standardization of whites and colors in appliance finishes should be as widespread as standardization of nuts and bolts.

Howard Landis
Major Appliance Editor

JUNE • 1932 finish

What is white?

pinion editorial representatives of merchant and laymen" magazines, plus a suggestion for coordination

Better Living

To Finish:

I have always been interested in having a single standard of white for major home conveniences. In fact, I have watched many attempts in this direction during the time I have been working with equipment. With this new attempt, I hope that you will be able to accomplish a single standard white and one that will hold up during use in the home.

Esther Kimmel
Food and Equipment Editor

Editor's Note:

The *Finish Line* editorial for April raised these questions: (1) should white for metal products—particularly appliances for kitchen and laundry—be standardized, and (2) is there a technical and practical solution to the question of standardizing white finishes?

May *finish* presented the opinions of nine leading editors, all pointing to the desirability of standardizing white for home appliances.

On these pages you may read similar expressions of opinion by four additional editors, plus a constructive suggestion concerning a possible coordinating organization for a standardization program.

As explained in our opening editorial, *finish* will publish opinions and comments from all sources, and act as a "sounding board" for the technical progress and practical achievements relating to the subject.

In future issues, we shall plan to present the opinions of manufacturers and manufacturers' cooperative organizations on this subject, as well as reports of constructive work in progress.

The Inter-Society Color Council



The Vitro Manufacturing Company

To Finish:

I have been reading your editorials in April and May issues of *Finish* on the problem "How White is White."

As ex-chairman of the American Ceramic Society Delegation to the Inter-Society Color Council, I would call your attention to the fact that the Inter-Society Color Council could be the ideal organization to study and make recommendations on this particular problem.

The Inter-Society Color Council is an organization whose primary aims are to "stimulate and coordinate the work being done by the various societies, organizations, and associations leading to the standardization, description and specification of color, and to promote the practical application of these results to color problems arising in science, art and industry." From the above aims and purposes of the Inter-Society Color Council, as taken directly from their articles of Organization and Procedure, it would seem feasible that the Porcelain Enamel Institute or the American Ceramic Society could throw this particular problem into the laps of the Inter-Society Color Council. These people are experts on white and color in all its phases. Their recommendations would have considerable standing and influence in the defining of white and the standardization of white color for the various segments of the porcelain enameling industry.

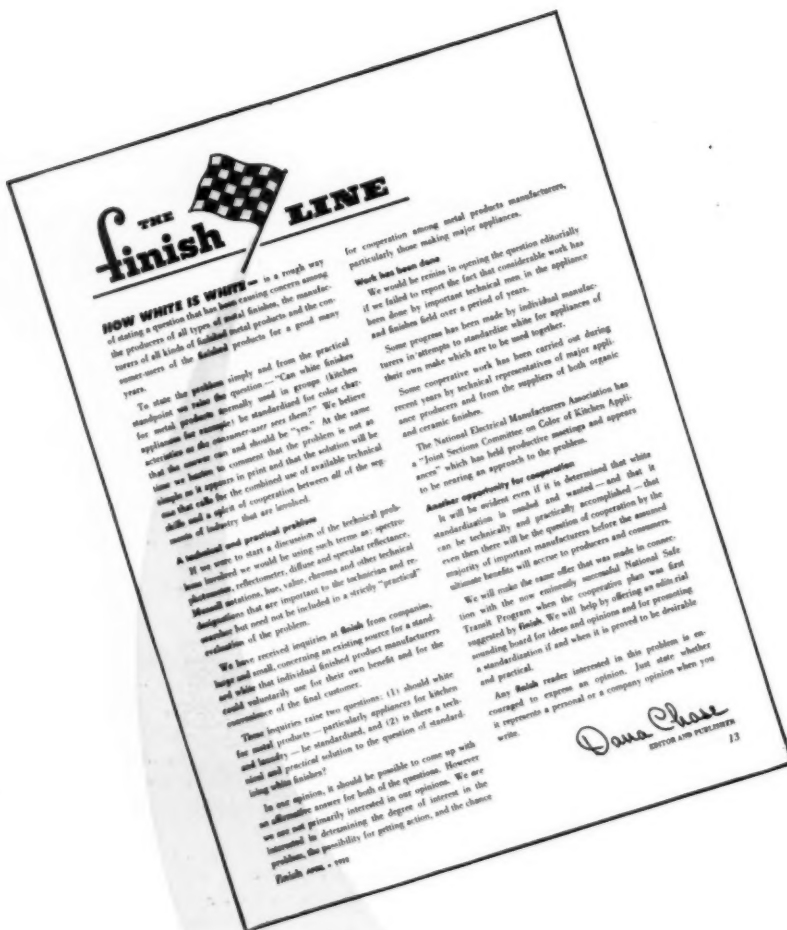
Theodore Lenchner

Thank you, Mr. Lenchner, for your suggestion. We shall be glad to place the work of the Inter-Society Color Council before *finish* readers as it is made available to us. Your suggestion would appear to be one possible solution to the question of coordination.

It should be made clear that a color coordination program would need to encompass all types of finishes and materials used as a final white finish for household appliances. As reported earlier, the National Electrical Manufacturers Association has a "Joint Sections Committee on Color of Kitchen Appliances" which has done much constructive work on this problem, and is working with and for the primary interested sources—the appliance manufacturers.

As the work of all interested groups is reported, it is expected that it will not be difficult to evolve a logical program for coordination.

Finish will welcome communications from all individuals, companies, or cooperative groups interested in color standardization of white finishes for home appliances.



Ladies' Home Journal

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Retailing Daily

To Finish:

Standardizing the white finish of home appliances is as important to the housewife as having the right matching job done on the finish of the family's new Cadillac which she has just rubbed against a tree. If the touch-up job isn't done right, if the colors haven't been matched right, the car will still run beautifully. But it will have lost a little of its value as a family display piece.

The same thing is true of new appliances, undoubtedly the best looking and most efficient ever built for the home. Today appliances are made to please the eye as well as to serve a function. If the white finish which predominates on most major appliances does not match from manufacturer to manufacturer, or even among the products of the same manufacturer, some of the lustre and glamor surrounding them today will be lost on the housewife when these appliances are placed beside each other in the home.

Standardizing white is important also, because it would be a major step toward standardizing other colors. . . . Standardization of whites and colors in appliance finishes should be as widespread as standardization of nuts and bolts.

Howard Landis
Major Appliance Editor

White is white?

Editorial representatives of merchant associations, "leisure" magazines, plus a suggestion for coordination

Better Living

To Finish:

I have always been interested in having a single standard of white for major home conveniences. In fact, I have watched many attempts in this direction during the time I have been working with equipment. With this new attempt, I hope that you will be able to accomplish a single standard white and one that will hold up during use in the home.

Esther Kimmel
Food and Equipment Editor

Editor's Note:

The *Finish Line* editorial for April raised these questions: (1) should white for metal products—particularly appliances for kitchen and laundry—be standardized, and (2) is there a technical and practical solution to the question of standardizing white finishes?

May *finish* presented the opinions of nine leading editors, all pointing to the desirability of standardizing white for home appliances.

On these pages you may read similar expressions of opinion by four additional editors, plus a constructive suggestion concerning a possible coordinating organization for a standardization program.

As explained in our opening editorial, *finish* will publish opinions and comments from all sources, and act as a "sounding board" for the technical progress and practical achievements relating to the subject.

In future issues, we shall plan to present the opinions of manufacturers and manufacturers' cooperative organizations on this subject, as well as reports of constructive work in progress.

The Inter-Society Color Council



The Vitro Manufacturing Company

To Finish:

I have been reading your editorials in April and May issues of *Finish* on the problem "How White is White."

As ex-chairman of the American Ceramic Society Delegation to the Inter-Society Color Council, I would call your attention to the fact that the Inter-Society Color Council could be the ideal organization to study and make recommendations on this particular problem.

The Inter-Society Color Council is an organization whose primary aims are to "stimulate and coordinate the work being done by the various societies, organizations, and associations leading to the standardization, description and specification of color, and to promote the practical application of these results to color problems arising in science, art and industry." From the above aims and purposes of the Inter-Society Color Council, as taken directly from their articles of Organization and Procedure, it would seem feasible that the Porcelain Enamel Institute or the American Ceramic Society could throw this particular problem into the laps of the Inter-Society Color Council. These people are experts on white and color in all its phases. Their recommendations would have considerable standing and influence in the defining of white and the standardization of white color for the various segments of the porcelain enameling industry.

Theodore Lenchner

Thank you, Mr. Lenchner, for your suggestion. We shall be glad to place the work of the Inter-Society Color Council before *finish* readers as it is made available to us. Your suggestion would appear to be one possible solution to the question of coordination.

It should be made clear that a color coordination program would need to encompass all types of finishes and materials used as a final white finish for household appliances. As reported earlier, the National Electrical Manufacturers Association has a "Joint Sections Committee on Color of Kitchen Appliances" which has done much constructive work on this problem, and is working with and for the primary interested sources—the appliance manufacturers.

As the work of all interested groups is reported, it is expected that it will not be difficult to evolve a logical program for coordination.

Finish will welcome communications from all individuals, companies, or cooperative groups interested in color standardization of white finishes for home appliances.

PAIN-T-MISER[®]

PROVES FAR SUPERIOR IN ACTUAL TEST

Hamilton Manufacturing Company
Two Rivers, Wisconsin
December 6, 1951

Ashdee Products, Inc.
18029 Dixie Highway
Homewood, Illinois

Gentlemen:

After investigating numerous finishing processes a little over a year ago, we decided on yours mostly because we felt it had all of the advantages of any automatic process plus some features not found in others. The fact that your unit uses 110 volt A.C. input, does not require endless royalty payments, finishes parts supported on simple work holders, and covers sheared edges satisfactorily without excessive build up were the deciding points.

Now after a little over six months of operation on a production line using well over 100 gallons of paint per day, we find results very pleasing. Material savings of at least 35% and labor savings of over 60% have been our experience. Furthermore, the amount of reinforcing required on recessed areas is so small that we have only one spray operator for this work and he uses less than 15% of the total amount of paint used in the whole system.

We feel that your unit has done everything expected and do not hesitate to recommend it to others.

Very truly yours,

HAMILTON MANUFACTURING COMPANY

F. A. Gorski

F. A. Gorski
Material Research Division

PAQ:LM

Manufacturers of | AUTOMATIC CLOTHING DRYERS & WOOD AND STEEL
ENGINEERS, DENTISTS, PHYSICIANS, CHEMISTS, MURKIN

Read what this
Prominent
Paint-Miser User says...

**—Then Compare
This Performance
Against your
Present Equipment**

"NO ENDLESS ROYALTY PAYMENTS"

"LABOR SAVINGS OF OVER 60%"

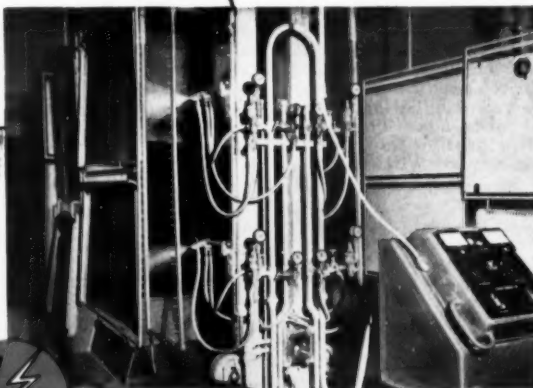
"MATERIAL SAVINGS OF AT LEAST 35%"

"WITHOUT EXCESSIVE BUILD-UP ON EDGES"

"RESULTS VERY PLEASING"

"RECOMMEND IT TO OTHERS"

Hamilton's own words and pictures tell the profit story of Paint-Miser, the modern, electronic paint-spray unit. Find out how you can enjoy these immense savings in your finishing department. Ask us to send a Paint-Miser expert to you. No obligation. Write or wire at once.



ASHDEE PRODUCTS, INC.

18029 Dixie Highway • Homewood, Illinois

Right: Technical sessions during the AES convention will be held at the Conrad Hilton (Stevens) Hotel.



Industrial finishing exposition in Chicago

show at International Amphitheatre sponsored by American Electroplaters Society in conjunction with the AES 39th annual convention at Conrad Hilton Hotel

FIVE educational exhibits, 10 technical sessions, 120 new products, 2,000 electroplating specialists, 25,000 industrial representatives and \$3,000,000 worth of machinery and equipment.

That about sums up the 3rd Industrial Finishing Exposition of 1952 scheduled to make its appearance at Chicago's International Amphitheatre, June 16 — 19. The two other Expositions were held in Detroit and Atlantic City.

Sponsored by the American Electroplaters' Society, a technical society

comprising 5,500 men and women in the industrial finishing field, the Exposition promises to be the biggest in AES history. Concurrently, the Society will hold its 39th annual convention at the Conrad Hilton Hotel.

Enlarged this year to include the manufacturers of paint, lacquer, enamels, spray painting equipment, ovens, industrial tapes, and temperature controls, the Exposition heretofore was limited to the display of base metals and chemicals, plating and polishing equipment and associated products.

Technical sessions

Monday afternoon, Section A — Ralph Wysong, Studebaker Corp., chairman — "Use of Ion Exchange Resins in Purification of Chronic Acid Solutions" by Floyd Gilbert, Rock Island Arsenal, and W. S. Morrison, Illinois Water Treatment Co.; "Reduction of Contamination in Waste Waters" by D. Milne, General Motors Corp.; "Filtration, Theoretical and Practical" by Harold W. Faint, Industrial Filter and Pump Mfg. Co., and R. S. Modjeski, Scientific Control Laboratories. →

Monday afternoon, Section B — Vince Mattacotti, Milwaukee Plating Co., chairman — *"Heavy Rhodium Plating"* by Dr. Harold Wiesner, Bendix Aviation Products Co.; *"Color Movie on Plating at Westinghouse"* by G. W. Jernstedt, Westinghouse Electric Corp.; *"Black Nickel—Some New Investigations"* by Dr. Walter Meyer, Enthone, Inc.

Tuesday morning, Section A — Frank Clifton, General Motors Corp., chairman — *"Recent Developments in Plastics"* by Dr. D. Gardner Foulke, executive secretary, American Electroplaters' Society; *"Construction Details of a Plating Plant"* by Dr. Russell Harr, Western Electric Co.; *"Materials and Alloys Used in Waste Disposal Units"* by Fred Burne, Chrysler Jet Engine Plant.

Tuesday morning, Section B — M. Beckwith, The Harshaw Chemical Co., chairman — *"Vacuum Metallizing Today"* by J. G. Seiter, J. F. Stokes Machine Co.; *"Current Distribution in Mechanical Plating—A Statistical Study"* by William Geissman, National Lock Co.; *"White Brass Plating"* by R. B. Salstonstall, Udylite Corp.

Wednesday morning — R. A. Pettit, Chicago Thrift-Etching Co., chairman — *"Substitute Finishes,"* by Myron Ceresa, Westinghouse Electric Corp.; *"Hard Coatings on Aluminum"* by F. Keller, Aluminum Company of America; *"Instrumentation in the Plating House"* by Dr. Frank Savage, Savage-Rowe Plating Co.

Thursday morning — *"The Research Programs and the Platers"* by E. J. Serfass, Lehigh University; *"Practical Applications of Project 12"* by Henry Linford, Columbia University; *"Setting Up a Waste Disposal Unit"* by B. F. Dodge, Yale University.

DEVILBISS MOVES MIDDLE EAST DISTRICT OFFICES

Henry M. Kidd, vice president and sales manager of The DeVilbiss Company's spray painting equipment division, announced that headquarters of the firm's middle eastern states district have been moved from Cleveland to Toledo to facilitate service and deliveries to customers. Roger F. Whitell continues as district manager and has established offices at the DeVilbiss plant in Toledo.

FLORENCE STOVE ACQUIRES QUAKER MANUFACTURING

Florence Stove Company, Gardner, Mass., has announced the purchase of Quaker Manufacturing Company, Chicago. It was pointed out that this move will eventually result in an increase of nearly four million dollars in new sales for Florence.

According to present plans, Quaker will be operated as a division of Florence, with production of the Quaker line of oil and gas heating equipment handled at Florence's Gardner factory.

Quaker was organized in 1888, and was one of the earliest heating stove manufacturers to concentrate on pot-type heaters.

CRANE BUYS ESTATE'S TOLEDO DESK & FIXTURE DIVISION

The Crane Company has established a new subsidiary, Toledo Desk & Fixture Company, Maumee, Ohio, to make steel kitchen cabinets and related products. The Ohio company was purchased for \$550,000 from Noma Electric Corp., and had been operated as a part of Estate Stove Company, a Noma subsidiary.

GLOBE AMERICAN NAMES ALLEN ENAMEL FOREMAN

Globe American Corporation, Kokomo, Indiana has announced the appointment of Delbert "Deb" Allen



as foreman of the enamel department. Globe American produces Maytag Dutch Oven ranges.



Stove men to celebrate 20th anniversary

THE 20th annual convention and exhibit of the Institute of Cooking and Heating Appliance Manufacturers will be held at the Netherland Plaza, Cincinnati, June 2, 3 and 4.

Program highlights will include sessions on political-economic trends, selling, executive problems, labor relations, and government controls.

The meeting will open *Monday morning*, June 2, with a meeting of the ICHAM board of trustees. Concurrent meetings will include the Marketing Committee, and Oil Division Technical Committee.

Monday afternoon sessions will be devoted to meetings of the Gas and Combination Range Division and the Oil Division.

The *general session* will be held *Tuesday morning*, followed by the general luncheon. There will also be special luncheons for the Kerosene Stove and Sleeve-Type Burner Manufacturers and Solid Fuels Division.

Tuesday afternoon will be given over to meetings of the Electric Range Division and the Gas Space Heater and Floor Furnace Division.

Tuesday afternoon will be given over to meetings of the Electric Range Division and the Gas Space Heater and Floor Furnace Division.

"Mid-States Four" to highlight 20th anniversary celebration

The president's reception and banquet (20th anniversary celebration) will be held *Tuesday evening*. Guests of honor will be previous presidents of ICHAM and their wives.

Music will be furnished by Johnny Long's orchestra, and special entertainment will be by the "Mid-States Four," 1949 International Champions of the Society for the Preservation and Encouragement of Barbershop Quartet Singing in America, Inc.

Wednesday morning will be devoted to concurrent sessions for sales and advertising executives, financial,

accounting and credit executives, and labor relations executives.

Among the 60 exhibitors are ten of the original suppliers who displayed

their wares at the first informal exhibit held 15 years ago. Each of these ten has been represented at all ICHAM exhibits since.

CONVENTION HIGHLIGHTS

Monday Afternoon

"The Value of Marketing Research in the Oil Heater Business" by A. J. Tener, vice president and secretary, Perfection Stove Company

Tuesday Morning—General Session

"The Sun Will Shine Again" — by Walter F. Muhlbach, ICHAM president, and director of distribution and research, Florence Stove Company

"How to Keep Our Liberty" — by Raymond Moley, contributing editor of *Newsweek* and author of that magazine's "Perspective" page, and professor of public law at Columbia University

"Free Collective Bargaining Vs. Government Encroachment on Employee Relations" — by Carl P. Bersing, director of industrial relations, Norge Division, Borg-Warner Corp.

"A Dealer Looks at the Stove Business" — by Mort Farr, president, Mort Farr's, Inc.

Tuesday Afternoon

"The Electric Range and Trends in Modern Kitchen Planning" — by Albert P. McNamee, manager of home appliance marketing, McCall's Publications

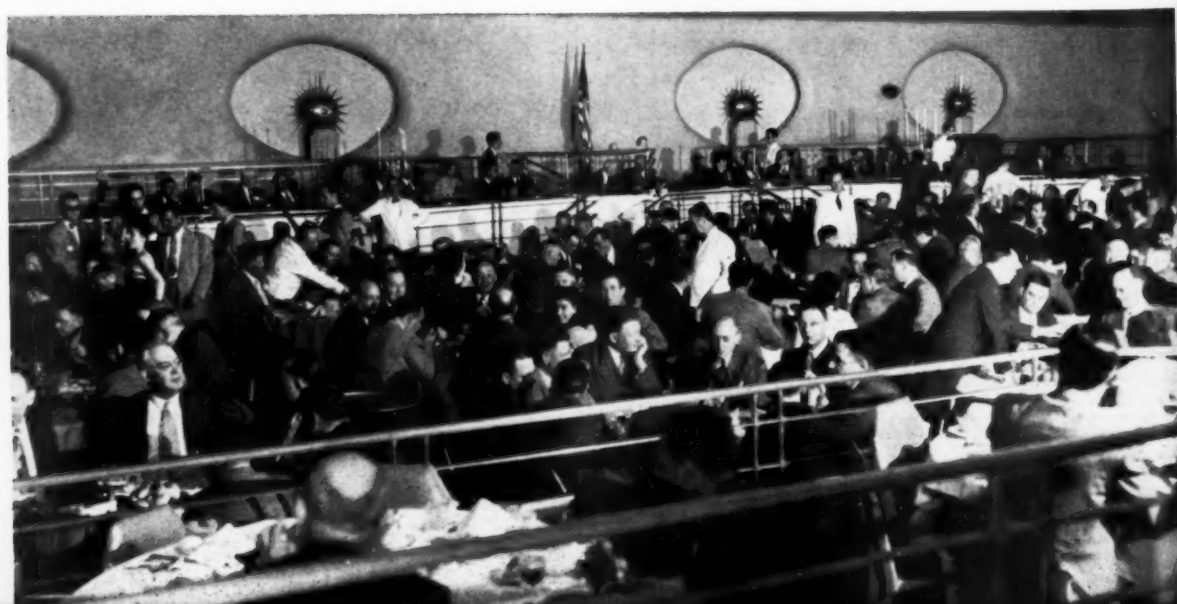
Wednesday Afternoon

"Cost Accounting Principles for Defense Contracts" — by Henry W. Sweeney, Henry W. Sweeney & Company

finishfotos from previous ICHAM conventions ▸



Right: The "Mid-States Four" will give out with barbershop harmony.





I.C.H.A.M.

finishfotos from preceding stove meetings





GRINDING
• PEBBLE MILLS

IN PORCELAIN ENAMEL AND GLAZE PRODUCTION

PATTERSON

satisfactory *MACHINERY* serves the industry!



MIXING
• TYPE E MIXERS

• The highest technical standards of performance are maintained constantly with Patterson Mills and Mixers—chosen by progressive enamel and ceramic manufacturers everywhere for maximum efficiency in operation and dependable long life. May we bring you the facts?

Richard L. Cameron

The Patterson Foundry and Machine Company
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NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI,
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The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada
MONTREAL



NEWS

WATER HEATER SHIPMENTS UP

The Gas Appliance Manufacturers Association estimates automatic gas water heater shipments for the first quarter of 1952 at 447,000 units, 6.6 per cent greater than shipments for the last quarter of 1951, and compared with 662,300 units shipped during the first quarter of 1951.

MIT METALS PROCESSING

LAB TO BE DEDICATED

The new Metals Processing Laboratory at the Massachusetts Institute of Technology will be dedicated on June 3, and will be followed by a two-day technical conference on metal cutting, according to Dr. T. K. Sherwood, dean of engineering.

KELVINATOR BOOSTS

PRODUCTION SCHEDULES

Nash-Kelvinator Corp. is scheduling production in the final months of their fiscal year, ending September 30, at substantially higher levels than the firm was able to maintain during the six months previous to March 31. The statement was made by George W. Mason, president, in a recent letter to stockholders.

ANDERSON NAMED MANAGER WESTINGHOUSE LAUNDRY DEPT.

J. J. Anderson has been appointed manager of the laundry equipment department for Westinghouse Electric Appliance Division, Mansfield, Ohio,

finish JUNE • 1952

according to a recent announcement by T. J. Newcomb, sales manager. He succeeds R. J. Sargent, who was made division major appliance manager.

GAMA PLANNING FOR LARGEST EXHIBIT IN HISTORY

The Gas Appliance Manufacturers Association reports that the exhibition to be staged in conjunction with the 34th annual convention of the American Gas Association, in Atlantic City, October 27-30, will be the largest display of appliances and equipment in the history of the gas industry.

The demand for space is reported to be so great that an additional 2,000 feet of floor space, never used in any exhibition before, has been made available to GAMA members.

IRON FIREMAN NAMES WEBB

E. C. Webb has been appointed vice president in charge of production and engineering, Iron Fireman Mfg. Co., Cleveland, Ohio.

ARTKRAFT COMPLETES MERGE WITH BALTIMORE PORCELAIN

Artkraft Mfg. Corp. and Baltimore Porcelain Steel Corp. have merged under the name Universal Major Elec. Appliances Inc. Home appliances to be marketed under the Universal name will include refrigerators, freezers, automatic and conventional washers, driers, ironers, elec-

tric ranges, water heaters, dishwashers, garbage disposers, kitchen cabinets, television sets, room air conditioners and dehumidifiers.

NESCO FACTORY MANAGER

M. A. Simpson has been appointed factory manager of the plant of Nesco, Inc., Granite City, Ill.

HOLLOWAY JOINS LAWNSDALE

A. J. "Bert" Holloway was recently appointed works manager of Lawndale Enameling Co., Chicago, according to an announcement by Arthur M. Lander, president.

Holloway was recently associated with Geo. D. Roper Corp., and previously was with Ferro Corporation, and Cribben and Sexton Co.

OIL-FIRED UNITS UP 127%

A 127% rise in domestic central heating oil burners from July 1, 1945, to January 1, 1951, was reported by the Plumbing and Heating Industries Bureau. The bureau also stated that 134,000 separate oil-fired water heaters are now in use in American homes.

WESTINGHOUSE-JOHNS HOPKINS JOINT EDUCATIONAL PROGRAM

A new educational program, the Westinghouse-Johns Hopkins Awards in Electrical Engineering for 1952, has been established to help deserving young persons pursue careers in electrical engineering.

The awards will enable 30 students a year to combine work experience at Westinghouse with technical studies leading to a Certificate in Electrical Engineering to be granted by McCoy College of The Johns Hopkins University.

The program is being administered by D. C. Lee, manager of industrial relations for Westinghouse.

ARMOUR RESEARCH APPT.

Dr. James A. Stavrolakis, technical engineer for General Electric Co., Oak Ridge, Tenn., has been appointed a supervisor in the ceramics and minerals department at Armour Research Foundation of Illinois Institute of Technology.

"Come, join us in a cup of coffee"

EVERY MORNING 9:00 TO 11:00 DURING

ICHAM

BOOTH No. 39

JUNE 2nd to 4th 1952 • Cincinnati, Ohio



IT CAN BE PROFITABLE!

Good things happen over coffee. That's why we serve it each year at ICHAM.

We like to think this hospitality is a reflection of the way Ferro has always done business. Other people call them customers. We call them friends. Friends whose confidences we respect—friends we try to serve every way we can.

Few companies furnish the appliance industry with as many products as Ferro. For example:

- Custom-made porcelain enamel frit
- Enameling supplies of all types
- Color oxides
- Ferro engineered and built finishing ovens
- TK Monotube* electric surface cooking units
- Switches and controls

- Baking and broiling units for electric range ovens
- Electric heating elements for clothes dryers, refrigerator defrosters, dishwashers, roasters, water heaters and other appliances.

And don't overlook Ferro's research and wide industrial experience. That's a definite plus when it comes to helping appliance makers solve problems.

Yes, drinking coffee can be profitable — if it stirs up an idea for a better product. So make it a point to join us at ICHAM and let's talk about the latest developments affecting your business.

Special Note to Those Not Attending ICHAM:

You can get the same service (minus the coffee) by writing to us about your product problems.

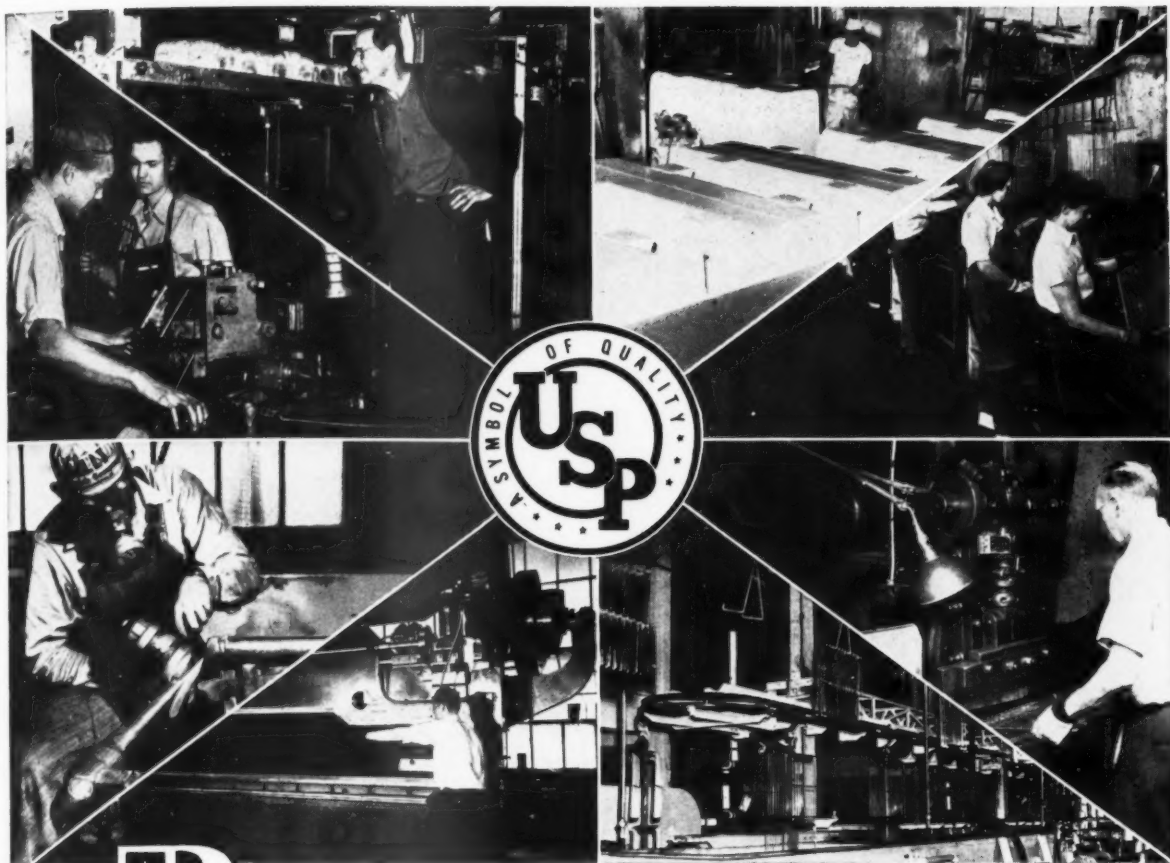
*T. M. Reg. U. S. Pat. Off.



Porcelain Enamel Division
FERRO CORPORATION
CLEVELAND 5, OHIO

FERRO ELECTRIC PRODUCTS, INC.
A subsidiary of Ferro Corporation
KIRKLAND, ILLINOIS

TUTTLE & KIFT, INC.
A subsidiary of Ferro Corporation
CHICAGO 39, ILLINOIS



Ready, willing and able!

FOR DEFENSE SUBCONTRACTS

- ★ Experienced, able plant management.
- ★ Proximity to basic raw materials.
- ★ Adequate supply of skilled, satisfied labor.
- ★ Wire product and heavy equipment fabrication under one roof.
- ★ Low overhead.
- ★ Main line transportation from New York Central and major truck lines. Multiple sidings.
- ★ Centralized, non-strategic location.
- ★ AAA-1 credit rating (Dun and Bradstreet).

358,576 square feet of working floor space . . . equipment to handle the toughest jobs of wire or metal fabrication . . . and the skilled know-how to serve you better, faster, more economically. This is the picture at Union Steel Products . . . ready, willing and able to cooperate on defense subcontracts.

Special brochure, detailing USP's complete facilities will be sent you promptly on request.

UNION STEEL PRODUCTS COMPANY

Wire Products Division
ALBION, MICHIGAN



PLAN NEW CUBAN NICKEL PLANT

Nickel Processing Co., Nicaro, Cuba, will build a new process development plant as part of a program to produce additional tonnages of nickel and recovery of by-product cobalt.

The pilot plant will be built at the U.S. Government-owned Nicaro Nickel Plant, in Nicaro, which is operated by Nickel Processing under a management contract.

A majority interest in Nickel Processing Co. was recently acquired by

National Lead Co., according to a report.

AGA JOINS SERVEL IN REFRIGRATOR CAMPAIGN

The American Gas Association has joined Servel, Inc. in a promotion campaign to accelerate sales of gas refrigerators.

The campaign links the sales forces of manufacturer, gas utilities, and gas appliance distributors and dealers in bringing an "all-new" Servel gas refrigerator before the public.

PANEL DISCUSSION AT WEST COAST ENAMELERS MEETING

AN interesting and pertinent panel discussion on machinery and equipment problems highlighted the first 1952 meeting of the Pacific Coast Enamellers Club, in Los Angeles, April 25. Wally Bauer, of Western Stove Company, acted as panel moderator, and introduced each of five speakers who in turn gave a concise talk on a selected subject, then invited questions from Club members.

Mill grinding media

Joe Disario, of Smoot-Holman Company, talked first on the use of alumina balls in grinding, and de-

scribed the successful results his company had experienced with alumina balls during the past year. "We needed more output per shift, and discovered that alumina balls could do the job," Disario said. "After ironing out our techniques, we began to save from 40 to 50 per cent in milling time, and produced one-third more frit.

"During one full year of operation, we lost only 150 pounds from wear in a 2300-pound ball load, and mill lining wear was approximately $\frac{3}{8}$ -inch on the shell and $\frac{1}{8}$ -inch on the ends. Furthermore, this wear

was even all around. Overall, the cost of using alumina balls is about the same as with porcelain balls, but the alumina balls get out more enamel in less time."

Finer grinding and reciprocating spray machines

Hal Eggers, of Binks Manufacturing Company, was the next speaker, and he talked briefly on spraying equipment.

"We find that the finer grinds now being used give a substantial saving in overspray," Eggers said. He then went on to discuss reciprocating machines for flat wear. These machines are proving very effective when operated continuously at full capacity, he pointed out. "A 4-foot belt traveling a 15 fpm means a total spray area of 3600 square feet per hour. But a good booth is necessary to collect the overspray."

Magnetic separators and electronic furnace controls

Frank Fernholtz, of Fernholtz Machinery Company, discussed and compared various types of magnetic separators. He was followed by Tom Cahill, of Wheelco Instruments Company. Cahill pointed out the advantages of the continuously anticipating furnace controls over the direct deflection types more common in the past. "Such instruments take care of temperature changes when they occur, not after they occur, and have accuracy within $\frac{1}{4}$ of one per cent. The newer instruments of this type are electronically operated, are relatively simple, and are extremely sturdy."

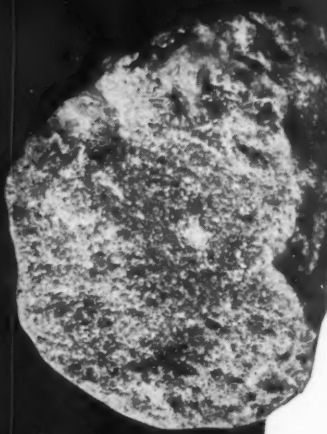
Mel Jontz, of Mel Jontz Company, finished the panel discussion with a short talk on ball mill operation. He substantiated Joe Disario's remarks on the use of alumina balls. They are also much faster in grinding paint," Jontz said. "I attribute this largely to their higher specific gravity which adds to their crushing ability when used at slow mill speeds. We found that mills would grind faster with alumina balls at 12 rpm than with porcelain balls at 18 rpm."

During the meeting, plans for a club picnic to be held on Saturday, May 31st, were discussed. Families and friends are invited to attend.

Left to right, panel members were: Front—Joe Disario, Smoot-Holman; Wally Bauer, Western Stove; Frank Fernholtz, Fernholtz Machinery. Back—Hal Eggers, Binks; Tom Cahill, Wheelco; Mel Jontz, Jontz Co.



Foote Lithium



acceptance of lithium's
unique properties for many important
industrial applications has spiraled into an
unprecedented...

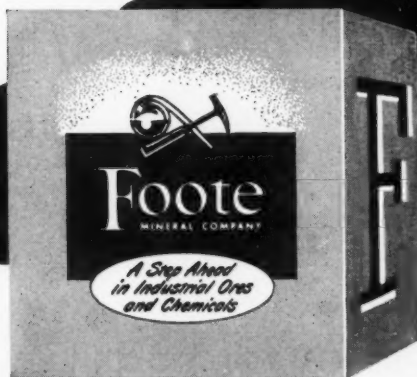
demand for Foote lithium
compounds in ceramics, welding fluxes, air
conditioning, pharmaceuticals, multi-purpose
greases and lubricants among others.
Although the...

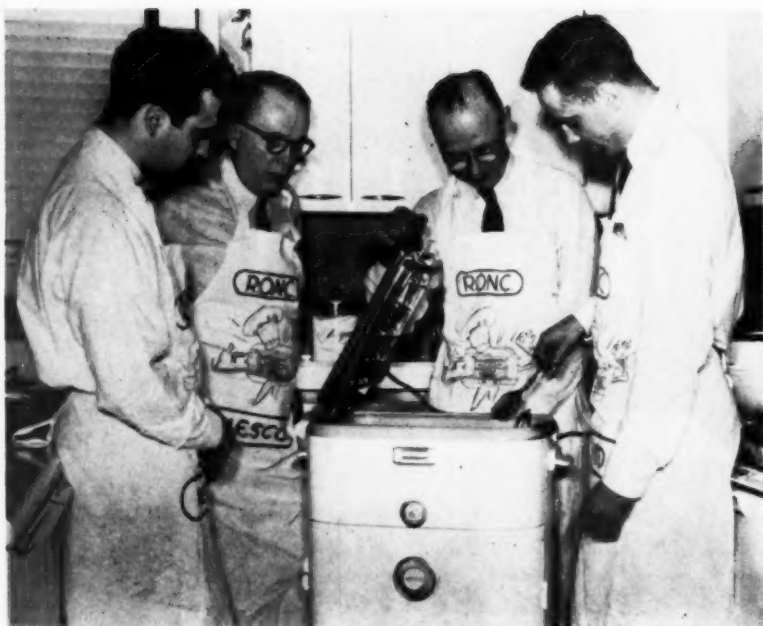
supply currently is short, Foote's
processing facilities are being expanded
to produce the lithium compounds you need.

Keep your eye on Foote...
for leadership in lithium.

FOOTE MINERAL COMPANY

HOME OFFICE AND RESEARCH LABORATORIES
412 Eighteen W. Chelton Building, Philadelphia 44, Pa.
PLANTS: Exton, Pa.; Kings Mountain, N. C.





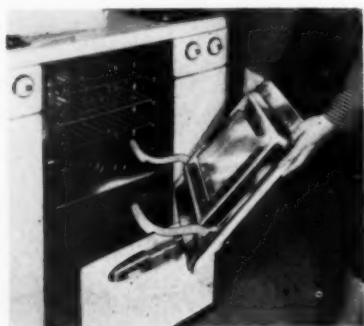
Nesco experimental model undergoes tests—at Nesco's research kitchens in Chicago. Left to right are Don Defano, Raymond Loewy & Associates; Paul Hill, Nesco vice president and director of sales; E. P. Altemeier, Nesco general merchandising manager; and R. H. Ellis, from the firm's merchandising division. The men are shown in their chef's aprons of the Royal Order of Nesco Chefs.

CENTRAL HEATING SHIPMENT FIGURES FOR FIRST QUARTER

A total of 111,000 gas-fired central heating equipment units were shipped during the first quarter of 1951 as compared with 170,200 units during the same period of 1951, according to the Gas Appliance Manufacturers Association.

TAPPAN RANGE FEATURES "LIFT-OFF" DOOR

Newest Tappan ranges feature a "Lift-Off" oven door, removable without aid of tools, to facilitate cleaning. Another new feature is the broiler



pan which pulls out the full length of the range for easier access.

Both innovations are standard with all models of the new Tappan Super-Sixty Series.

LYON METAL CHAIRMAN DIES

Earl D. Power, chairman of the board, Lyon Metal Products Inc., Aurora, Ill., died April 13.

He was a director and treasurer of the Illinois Manufacturers Association and was active in a large number of civic and business organizations. Prior to joining the Lyon Metal organization in 1928, Power was with White Motor Co., Cleveland.

ASTM EXEC. SECRETARY DIES

C. Laurence Warwick, executive secretary, American Society for Testing Materials, and its administrative head since 1919, died April 23, shortly after presiding at a dinner honoring the retiring treasurer of the Society.

Mr. Warwick was active in the Society since 1909 when he graduated from the University of Pennsylvania

in civil engineering. While he was instructor and assistant professor at the university, he also served as assistant secretary of ASTM with Edgar Marburg, the Society's founder secretary. In 1919, on the death of Dr. Marburg, he was appointed secretary-treasurer (chief executive officer), and in 1946 became executive secretary.

He made many notable contributions to the field of standardization and research in materials and was recognized as an outstanding authority on materials. During World War II, he served on the War Production Board as head of the Specifications Branch of the Conservation Division, and later as head of the Materials Division.

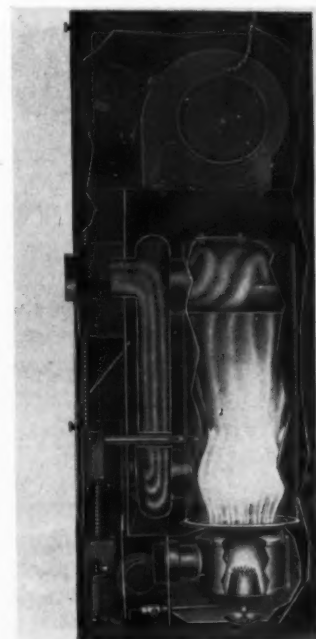
SHEPLER MFG. SOLD

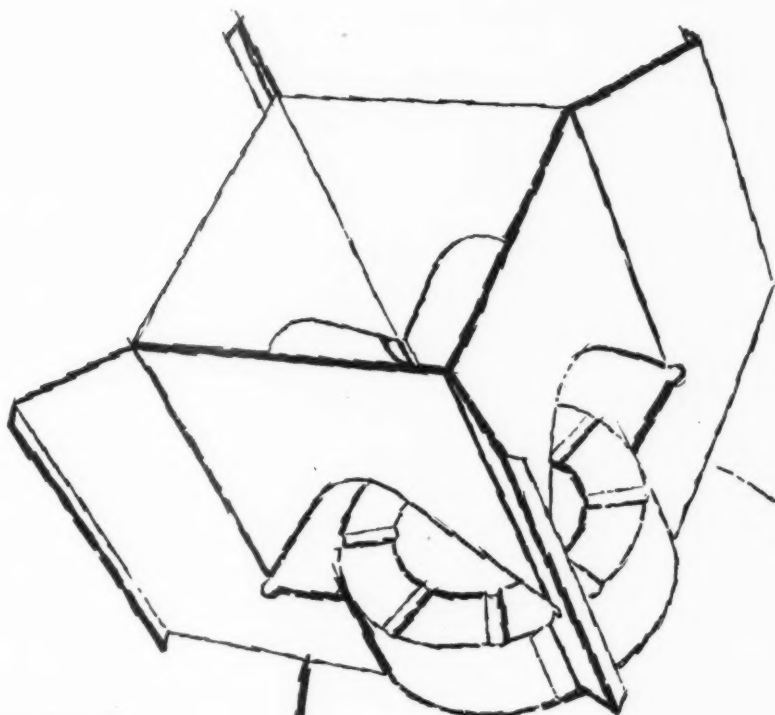
Shepler Manufacturing Co., Pittsburgh, producers of gas and electric heaters and ventilating fans, has been acquired by Lou Mervis, Pittsburgh industrialist.

R. S. Marthens is general manager of the firm, and Emil P. Burek, superintendent.

PERFECTION INTRODUCES COUNTERFLOW FURNACE

Perfection Stove Co., Cleveland, has introduced a new counterflow furnace





DON'T LET BOTTLE NECKS IN YOUR STAMPING DEPARTMENT TIE UP YOUR DEFENSE COMMITMENTS

Let New Monarch assume the responsibility for your stamping problems. The familiarity with government requirements we acquired during World Wars I and II, together with the accumulated benefits of more than 40 years in the die and stamping fields, enable us to assure your meeting your stamping commitments promptly.

Our special services include dies, tools, stampings, welding, assembly, finishing and packing. For a complete From-Blueprint-To-Shipping-Carton Service, it will pay you well to consult New Monarch.

Send blueprints for estimates. No obligation

*When in need of Stampings
See...*



Turn In Your Scrap
Now. It's Urgently
Needed for Defense.

NEW MONARCH MACHINE & STAMPING CO.
406 S.W. NINTH STREET
DES MOINES 9, IOWA

nace for perimeter heating of homes having ductwork under the floor or imbedded in concrete slab. The new unit is 22 inches wide and 25 inches deep. It is delivered as a packaged

unit fully wired and assembled. A 74,000 Btu oil furnace, it is reportedly convertible to gas in a matter of 15 minutes.

LT. CHASE AND HIS "SAIL"



Lieutenant Dana Chase, Jr., is shown with a 7'-3" Sailfish caught off the Florida coast during a recent brief vacation in Ft. Lauderdale during his final leave preceding shipment overseas.

Other members of the fishing party were Dana Chase, Sr., editor and publisher of *finish*; Mrs. Chase; H. F. Bond, Tuttle & Kift, Inc., and H. K. Dewees, H. K. Dewees Co., Atlanta.

Lt. (Doc) Chase, on leave of ab-

sence from his position as director of customer service for *finish* magazine, is a 2nd Lt. in the Infantry since he was called up a year ago as a reserve officer. For several months he was stationed at Fort Riley, Kansas, training recruits, and then for four months was at Ft. Benning, Georgia, for the Officers Combat Training course. As this is written, he will have arrived at Yokahoma, Japan, or other "points east."

ARMOR-VIT COATING AGAIN OFFERED FOR DEFENSE PRODUCTS

heat and corrosion resisting coating used during World War II

During World War II an alkali, aluminum silicate coating with high heat and rust resisting properties was used extensively as a protective coating for a broad group of metal products required for defense purposes.

The finish as specified called for a

high resistance to heat, rust, corrosion, impact, abrasion, scratch, acids and alkalis. Materials used to meet these specifications was sold under the trade names of Armor-Vit and Kaykote. These finishes, although ceramic in nature, had little relationship

to porcelain enamel, or to paint, lacquer, or other organic finishes. Used on both cast iron and steel, application was in the nature of one-thousandth of an inch in thickness.

Finish is informed that Armor-Vit is again being offered as a non-critical material for finishing defense items. Information concerning source may be obtained by writing on your company letterhead to *finish*.

LANDERS NAMES NEECE PRES.

Landers, Frary & Clark, New Britain, Conn., has announced the election of B. C. Neece as president and Richard L. White as chairman of the board.

Neece was formerly vice president and general sales manager. White, former president, succeeds Arthur E. Allen.

RYAN INDUSTRIES BUYS AMERICAN REFRIGERATION

S. C. Ryan, president, The Microtone Company, St. Paul, manufacturers of electronic equipment, has announced the purchase of American Refrigeration Corp., Hopkins, Minn., which will become a division of Ryan Industries.

Al Rose, formerly vice president — sales for Schaefer, Inc., has been named president and general manager of the Ryan refrigeration division. Rose indicated that plans call for continued production of farm and home freezers, and commercial low temperature cabinets for ice cream and frozen foods.

FRED SUTPHEN RETIRES

Fred G. Sutphen, enameling consultant for Armco Steel Corporation, has retired after 40-odd years in the enameling industry.

Sutphen joined the Armco organization in 1909 as assistant to the service engineer doing customer service work on Armco products. In 1913, he commenced devoting his time to the study of enameling practices and enameling stock.

Until 1932, he worked out of the production division of Armco. At that time he joined the Armco Re-

From Du Pont

Vitreous Enamels for Aluminum

Durable vitreous enamel finishes for aluminum are now available *in a wide range of colors*. Developed and thoroughly field tested by Du Pont, these finishes offer the combined advantages of color appeal, durability and ease of fabrication. And they can be readily applied by the enameler using ordinary enameling and firing procedures.

WHERE ALUMINUM ENAMELS CAN BE USED

- Roofing
- Structural Siding
- Wall and Ceiling Panels
- Signs and Labels
- Furniture and Cabinets
- Tanks
- Architectural Tile
- Electrical Shielding
- Pipes and Fittings
- Appliance Parts

HOW ALUMINUM ENAMELS ARE APPLIED

Enamel slips used in the finishing process are prepared with specially adapted Du Pont frits and are based on Du Pont formulations. These formulations and other technical assistance in the application of Du Pont vitreous enamels on aluminum are offered to enamellers without charge. The coupon below will bring you full information. Clip and mail it today to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Del.

WHAT ALUMINUM ENAMELS CAN MEAN TO YOU

Du Pont aluminum enamels open new markets for enamellers and metal fabricators alike . . . permit wider use of lightweight aluminum alloys in both structural and decorative applications. Here's why:

COLOR APPEAL . . . Available in a wide range of colors and degrees of surface gloss.

DURABILITY . . . Du Pont aluminum enamels are light-fast and show excellent resistance to corrosion, abrasion, thermal shock, impact and flexing and have a high dielectric strength.

EASE OF FABRICATION . . . Enameled aluminum can be sheared, sawed, drilled and punched without damage to the coating—thus eliminating costly prefabrication.

INCREASED STRENGTH . . . A standard-thickness coating of vitreous enamel increases the rigidity of sheet aluminum as much as 70%. Increased rigidity means that lighter gauge material can be used—with substantial savings.

DU PONT VITREOUS ENAMELS FOR ALUMINUM



150th Anniversary
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

Please send more information on Du Pont vitreous enamels for aluminum: Properties, uses, formulations, methods of applying, etc. I am interested in enameling the following types of work:

- | | | |
|--|---|---|
| <input type="checkbox"/> Roofing | <input type="checkbox"/> Cabinets | <input type="checkbox"/> Signs and Labels |
| <input type="checkbox"/> Structural Siding | <input type="checkbox"/> Architectural Tile | <input type="checkbox"/> Tanks |
| <input type="checkbox"/> Wall and Ceiling Panels | <input type="checkbox"/> Electrical Shielding | <input type="checkbox"/> Pipes and Fittings |
| <input type="checkbox"/> Furniture | <input type="checkbox"/> Appliance Parts | <input type="checkbox"/> Other |

Name _____ Position _____

Firm _____

Street and No. _____

City _____ State _____

search Laboratory staff as enameling consultant. In this capacity, he visited most of the enameling plants in the United States and Canada. His long and varied career made him not only one of the oldest, but also one of the outstanding members of the industry.

He is a member of the Central District Enamellers Club, the Eastern Enamellers Club, the Midwest Enamellers Club, and the American Ceramic Society. His years in the industry made him a member of long standing in the "Old Timers Club."

In appreciation of his service to the industry, his associates presented Fred with a watch and a bound booklet containing letters from many friends throughout the industry.

USS BOARD CHAIRMAN RETIRES

Irving S. Olds, having reached the corporation's retirement age, has retired as chairman of the board of United States Steel Corp., and has been succeeded as chairman by Benjamin F. Fairless.

Fairless, named the chief executive officer of the firm, will continue as president, a position he has held since January 1, 1938. He will also continue as president of United States Steel Co., the steel operating subsidiary.

ACME ALUMINUM FOUNDRY EXPANDS FACILITIES

Acme Aluminum Foundry Company, Chicago, recently completed

O. L. EARL



and is occupying an addition to their plants. The company now has increased facilities for heat treating, dichromating and finishing of aluminum and magnesium castings. This completes their expansion after installation of additional molding equipment and melting furnaces.

O. L. (Ollie) Earl is president of Acme; W. H. Osborne is vice president.

NEMA DEHUMIDIFIER CHAIRMAN

H. Hartmann vice president and general manager, Fresh'nd-Aire Company, a division of Cory Corporation, Chicago, has been elected chairman of the newly-organized Dehumidifier Section of the National Electrical Manufacturers Association.

AULT NAMED CHI VIT V. P.

A. S. Ault has been elected vice president - sales, Chicago Vitreous En-



A. S. AULT

amel Product Co., according to an announcement by William Hogenson, president, Ault has been manager of sales and service since 1948.

An Ohio State University graduate, he worked for Frigidaire and Briggs before joining Chicago Vit in 1936. He was service engineer and eastern district manager before becoming manager of sales.

SCHAEFER FACTORY APPTS.

Robert B. Morris, vice president, Schaefer, Inc., Minneapolis, has announced the appointments of Joseph

H. Schneider, formerly assistant production manager, as factory superintendent, and Richard E. Smith, formerly of Milwaukee, as design engineer.

DESPATCH OVEN CELEBRATES FIFTIETH ANNIVERSARY

On Monday, June 9, Despatch Oven Company, Minneapolis, will hold an



C. P. DOHERTY

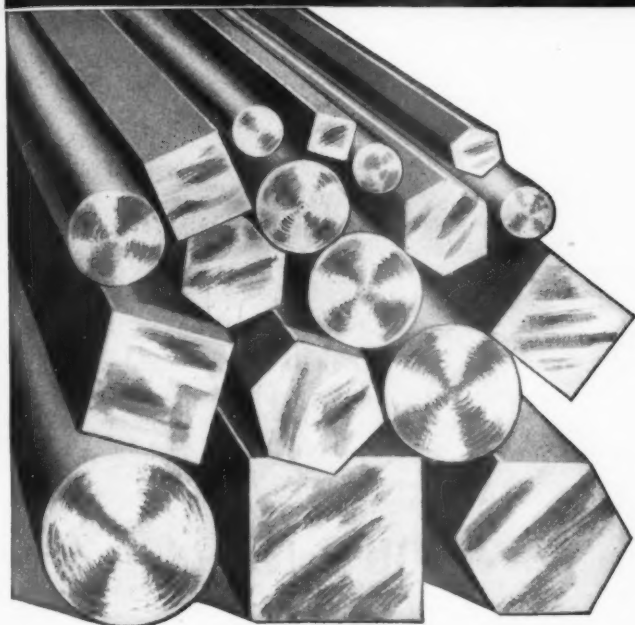
open house celebration commemorating fifty years of progress, according to an announcement by C. P. Doherty, president and general manager. The event is being held for the firm's customers and suppliers between the hours of 1 and 5 in the afternoon at the offices and factory, 619 S. E. Eighth Street.

Despatch, one of the largest manufacturers of a complete line of industrial ovens, industrial furnaces and related metal processing and finishing equipment, was founded by A. E. Grapp. Together with his son, H. L. Grapp, they introduced and developed a number of innovations that became the basis for an enterprise supplying equipment for controlled heat and humidity.

Since June, 1947, when the present board of directors was elected, Despatch has been under the management of its operations executives. They are C. P. Doherty, president and general manager; Fred Larsen, vice president and secretary; G. M. Lund, vice president and treasurer, and G. L. Schuster, vice president and

It's MISCO for HEAT RESISTING ALLOYS IN ROLLED MILL FORMS

Sheets — Plates — Rounds ● Squares ■ Hexagons ● Flats — Angles L
Channels U Sections — Pipe O Nuts ● Welding Rod —



Specify

MISCO METAL

(35 Ni—15 Cr—1¼ Si)

for your Enameling
Racks and Fixtures used
at High Temperatures.

Misco warehouse stocks
number more than 200
items of heat-resisting
Rolled Mill Forms.

Send for our Stock List—
Keeps you informed
monthly as to availability
and delivery of Misco
warehouse products.

POUNDS IN STOCK OR REPLACEMENTS EXPECTED			
Size	Misco Metal 35 Ni—15 Cr Type 330	Misco "B" 25 Cr—12 Ni Type 309	Misco "K" 25 Cr—20 Ni Type 310
Hot Rolled, Annealed			
ROUNDS			
¾"	316	817	1020
¾"	1728	512	—
¾"	727	217	—
¾"	1350	1155	882
¾"	803	1133	1720
¾"	578	244	697
¾"	208	—	2195
¾"	1175	3123	—
¾"	1992	—	41
¾"	2216	1748	—
¾"	2361	673	—
¾"	2440	1678	2394
¾"	2859	50	2424
1"	—	—	—

ROLLED PRODUCTS DIVISION Michigan Steel Casting Company

One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys

4815 BELLEVUE AVE. • DETROIT 7, MICHIGAN



chief engineer. Some of these men have been with the company during most of its existence.

In addition to the main office and plant in Minneapolis, the company maintains a Chicago sales office, and has sales representatives in all principal cities.

VERSON PRESS PROMOTE FOUR

D. C. Verson, president, Verson Allsteel Press Co., Chicago, recently announced the promotion of several members of the firm.

N. J. Kassnel was appointed vice president in charge of engineering. Paul Kjelstrom was named chief engineer. Chris Zeilenga was appointed chief engineer for research and development, and Henry DeMatteo was named assistant works manager.

IRON FIREMAN BUYS

PETRO OIL BURNER BUSINESS

A recent report states that Iron Fireman Manufacturing Co. has purchased the oil burner business of Pe-

troleum Heat & Power Co., Stamford, Connecticut. It was stated that production of Petro domestic, commercial and industrial oil burners will be transferred to the Iron Fireman plant in Cleveland, Ohio.

HOMMEL ESTABLISHES

WEST COAST WAREHOUSE

Ernest Hommel, president, The O. Hommel Company, has announced the establishment of an office, warehouse, and laboratory at 4747 East 49th Street, Los Angeles, Calif. A complete stock of ceramic colors, porcelain enamel frits, enameling oxides, chemicals and other ceramic materials will be warehoused.

N. D. "Bert" Slevin, who has served the porcelain enameling industry on the West Coast since 1946, will continue in his same capacity of servicing the industry from Hommel's new office. Frank Welsh has been appointed Southern California sales representative in the ceramic color and pottery frit division.

For the past 27 years the company has been serving the West Coast through a distributor.

PREDICTS 7 MILLION GAS

RANGE SALES DURING 1952-54

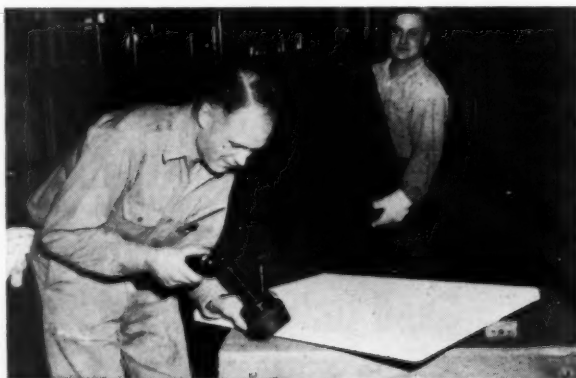
Hugh H. Cuthrell, speaking at the third annual Automatic Gas Range Conference in New York City recently, declared that there is a "strong possibility" the sale of new domestic gas ranges will exceed 7 million units during the three-year period ending in 1954. Cuthrell is president of Brooklyn Union Gas Company.

Cuthrell predicted that there will be 33,250,000 gas ranges in use at the end of 1954 compared to the 29,662,000 in use today, figuring that many ranges will be replacements.

ROBERTSHAW-FULTON ACQUIRES

RENNIKS SEAL PATENTS

The Fulton Sylphon Division of Robertshaw-Fulton Controls Co., Knoxville, Tenn., has acquired all manufacturing, sales, and patent



A NEW INSTRUMENT FOR CONTROL



In Metal Finishing Plants

Use it to spot check for mineral oil contamination in all phases of production. **FLUORETOR** is light and portable—handy as a flashlight. Works on the principle of fluorescence caused by ultraviolet light. Can be used to determine pH of solutions, to identify mill additives and other chemicals. Accurate and easy to use. Comes with belt holster and accessories. Write today for descriptive literature and prices.

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Have YOU Tried W-A1

METAL CLEANER

for immersion cleaning
prior to porcelain ename-
ling? It's a specification
material that has proved
its worth in many ena-
meling plants.

Same Quality

and

Same Price

for over 4 years



MANUFACTURERS OF
LEPCO PRODUCTS

V. B. PUNDERSON COMPANY

402 SWETLAND BUILDING

CLEVELAND 15, OHIO

rights in the seal developments of Renniks Company and Ralph L. Skinner, Sr., of Detroit, and transfer of operations to its Knoxville plant.

Ralph L. Skinner, Sr. will continue as a consultant on design and applications problems. Ralph L. Skinner, Jr. has joined the sales department of Fulton Sylphon as a sales engineer.

FERRO NAMES FOUR NEW OFFICERS

R. A. Weaver, chairman of the board, Ferro Corporation, Cleveland, has announced the election of G. E. Weber, treasurer and comptroller; Burt A. Stone, assistant treasurer; M. H. Foster, assistant secretary; and J. C. Wessel, assistant comptroller.

SHERWIN-WILLIAMS ADVANCES COTTON AND SPITZER

Two major appointments in the technical department of The Sherwin-Williams Co. have been announced by A. B. Holton, technical director.

H. J. L. Cotton, of Cleveland, was named technical coordinator, responsible for the general supervision of technical department activities in the fields of industrial product finishes and transportation finishes. He has been associated with the company since 1920.

H. E. Spitzer, of Chicago, was appointed director of development, with general supervision of the paint, varnish and lacquer development laboratories in Chicago. He has been with the company since 1937.

Richard A. Moore, supervisor of The Sherwin-Williams Co. Development Laboratory, Chicago, has been named director of the Chicago technical service department of the firm. Announcement was made by H. E. Spitzer, director of development at the Chicago laboratories.

Previous to his supervisory post, Moore headed the firm's appliance development work.

ACS annual meeting

→ from Page 48

elers clubs in the United States.

Dr. G. H. Spencer-Strong, of Pemco Corporation, referred to the help

finish JUNE • 1952





that a French group has received from studying the bylaws of the Eastern Enamellers Club. This newly-formed French enamellers club has held two meetings. The original meeting was a get-together of four persons. The second meeting had an attendance of 20 persons. Dr. Strong then introduced Lucien Cabanie and A. Jean Nicolin, of Japy Freres, of Paris.

The Pacific Coast Enamellers Club

was represented by Dick Iander, of the *Pacific Coast Ceramic News*. Iander reported that the West Coast club (centered around Los Angeles) is attempting to get management interested in club affairs. He stated that a drive is underway to get management personnel to participate in a "management, production-line" meeting scheduled for September.

E. C. Dexheimer, of Nesco, Inc., told the Committee members about

WHATEVER THE SIZE OR SHAPE...

it makes no difference whether you're
finishing refrigerators  or
 washing machines... chairs 
ironing boards  or any one
of hundreds of products

● On most production lines, The RANSBURG No. 2 PROCESS will give 25% to 75% more pieces per gallon than ANY other spray finishing system.

Of course, the increase will be much greater over conventional hand spray methods, and in ALL cases, there is

NO OVERSPRAY TO BE EXHAUSTED

Whatever your product might be, if your production volume justifies conveyORIZED painting, chances are The Ransburg No. 2 Process will do the job BETTER... and for LESS.

Electrostatic Painting Processes

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

the original enamelers' club of which he was a member. This organization existed in the St. Louis area a number of years ago, and its membership included many "old time" enamelers.

At the close of the meeting, the Committee went on record to offer assistance to any group interested in forming an enamelers club or other ceramic organization in the Pacific Northwest, including the western provinces of Canada.

Attending the Coordinating Committee meeting were the following:

Central Club — N. H. Stolte, The Enamel Products Company; Haskell Smith, Pemco Corporation; Bob Evans, Chicago Vitreous Enamel Product Co.

Eastern Club — R. R. Danielson, Metal & Thermit Corp.; G. H. Spen-

cer-Strong and Robert F. Patrick, Pemco Corporation.

Midwest Club — George Tuttle, Benjamin Electric Manufacturing Co.; Marcel Pouilly, The DeVilbiss Company; M. B. Gibbs, Inland Steel Company; E. C. Dexheimer, Nesco, Inc.; W. J. Plankenhorn, University of Illinois; Albert B. Friedmann, Chicago, Vitreous Enamel Product Co.; Dana Chase and Matt Heuertz, *finish* magazine.

Pacific Coast — Dick Iander, Pacific Coast Ceramic News.

Porcelain Enamel Institute — John Oliver, and George Warren, PEI Fellow at the National Bureau of Stds.

France — Lucien Cabanie and A. Jean Nicolin, of Japy Freres, Paris.

Mexico — Andrew A. Yarte, Productos Ceramicos, Monterrey.

Synthetic resins for industrial finishes

(Continued from Page 34)

a considerable degree it improves the water resistance and therefore it improves the protective properties of the films. The coatings so produced can be applied as air-drying or as baking coatings. In the latter instance a small quantity of melamine resin may be mixed with the styrenated alkyd so as to further improve hardness and durability.

The principal distinction of these resins, however, is their remarkable air-drying properties. Films from such resins seem to have the properties of a hybrid between air-drying enamels and air-drying lacquers. Depending on the speed of evaporation of the solvents used, coatings based on these resins can dry tack-free in periods of 15-60 minutes. In this they resemble nitrocellulose lacquers. They do, however, resemble enamel-coats in that dry film thicknesses of 1-2 mils are obtained in one coat instead of 0.25-0.6 mil films which are usually obtained per coat with most nitrocellulose lacquers. The advantages of fast dry and one-coat applications are combined. However, while the film is reasonably hard and can soon be handled, it must be handled with caution because its abrasion resistance and hardness do not attain an optimum for several days.

The oil in the alkyd portion of the resin must dry by air-oxidation before optimum film properties are realized.

In essence, the resins can be considered to be lacquers in which air-drying or oxidizing alkyd modifies a solvent type resin (polystyrene) — thus we can approach, but not quite equal, the nitrocellulose lacquer type dry, and also, the film approaches but never quite equals the curing properties of unmodified curing types of alkyds. (This kind of combination is not easily achieved in nitrocellulose lacquers, because if an oxidizing alkyd were used as a co-resin, it would separate from the lacquer resin when it cured, ruining the film properties.)

The styrenated alkyds represent our best compromise today between finishes having lacquer and enamel types of film properties. They contain both the advantages and disadvantages of each class, for example:

1. The easy application properties of alkyd films — thick films can be laid in fewer spray-coats than is possible with nitrocellulose lacquers. The films have high luster and are very decorative, require no rubbing or polishing to develop luster.

2. They set to a reasonably hard film very rapidly, like nitrocellulose lacquers, when the solvent evaporates. However, unlike nitrocellulose lacquers, the film requires considerably longer aging to develop maximum film properties.

3. The films are at least as durable as the better air-drying enamels, and more durable than most nitrocellulose lacquers (particularly in chalking resistance).

The greatest weakness of the styrenated alkyds comes from the same item which produces the good properties — it contains polystyrene. The polystyrene part of the resin can be softened by heat and attacked by coal tar or petroleum solvents, such as benzene or gasoline. This weakness can be minimized or even eliminated in baked finishes, and the resistance to solvent attack is improved somewhat on prolonged aging of air-dried films, but the weakness cannot be eliminated entirely. This means that styrenated alkyds cannot substitute easily for nitrocellulose lacquers in automotive finishes because spillage of gasoline might weaken the paint film on the fender. Or, it might mean that some lifting can occur if one attempts to re-coat styrenated alkyds at the wrong time, for example, the styrenated alkyd film will not lift when the film is very fresh (less than 4 hours old) or has aged for long periods, say 48 hours or longer. However, at intermediate hardening stages of about 4-48 hours, lifting can become a problem. If this resin is used as a primer, or if overlapping of coats occurs in a two-tone spray job, some care would have to be taken with the schedule of re-coating so that this does not coincide with the lifting period. This inferior solvent resistance would make the paint weak with respect to staining by road tar in a light colored automotive enamel.

The problem of inferior solvent resistance has limited the more extensive application of styrenated alkyds to those applications where poor solvent resistance is relatively unimportant. At the present date, such materials are being used in primers which are to be re-coated very soon after application, in special enamels

for military equipment, and for the greater part of the aluminum pigmented, decorative, hammer-pattern finishes which are very popular on equipment such as office and store fixtures, movie projectors, etc. Considerable research is being done to minimize this solvent resistance weakness, and no doubt the effort will succeed in some measure, thereby extending the utility of styrenated alkyds in production finishes.

Silicone alkyds

The same chemicals which were used in making the silicone resins of insulating varnish fame during the past war can be handled so as to get a reaction product with oil-modified alkyd resins which makes these resins part silicone and part alkyd. Such combinations cannot be made by simply mixing alkyds and silicone — an intimate chemical combination is necessary. These materials were explored by General Electric and others at least six years ago, but practical developments show that commercial possibilities have been proven only during about the last year. The principal promoters of these resins appear to have been Linde Air Products, Dow Corning and General Electric. Resins in commercial quantities are now supplied by the Plaskon Division of Libbey-Owens-Ford Glass Company.

In general, two classes of silicone modified alkyds are now being exploited:

Air-drying silicone alkyds — In handling and drying properties, these finishes are very similar to conventional alkyd enamels (they contain usually only small proportions of silicone). Field data have demonstrated that silicone-alkyd enamels possess superior resistances to chalking and remain more flexible during extensive weathering. Because of this greater exterior durability, these enamels should be useful where the premium price is justified, such as in maintenance finishes on structures where repainting is difficult, like in bridges, utility towers, advertising signs, etc. In common with the styrenated alkyds, the silicone alkyds have a tendency to be poor in solvent resistance

finish JUNE • 1952

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Any Quantity

**use an
INDUSTRIAL
Filter**

100 to 15,000 gallons per hour.
Portable and stationary models.
Standard or special filtration
systems engineered to meet
unusual requirements.

**Dependable
clarification pays . . .**



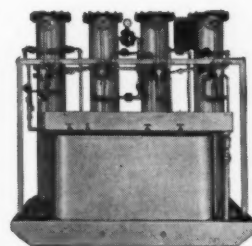
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The engineering, design, and construction of Industrial filters have proved out in long service and low maintenance costs. Industrial has the experience and is large enough to handle your filter requirements. Since 1927 filters and filtration systems have been an important part of our business.

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Standard two- and four-bed units available with
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WATER
DEMINERALIZERS

—the more silicone is used, the greater is this weakness. The air-drying types of silicone alkyds may find very little use in the field of industrial finishes, possibly because very few industrial applications which use air-drying alkyd finishes can justify the greater cost.

Baking types of silicone alkyds — These resins contain considerable proportions of silicone resin (25-75%). The cost naturally increases as do the

proportions of silicone.

Depending on how much silicone is present in the resin, the silicone alkyds have a resistance to discoloration and maintain protective properties at temperatures which would readily decompose films that are entirely organic. Resins containing greater proportions of silicone are often pigmented with aluminum and are used most frequently for finishes required to give corrosion protection

even when subject to continuous or intermittent exposure to high temperatures. This function naturally can be handled by unmodified silicone resins alone, but any possible dilution with alkyds will very rapidly decrease the cost and also minimize the problems of application somewhat. For best results, it is essential that the films should be very thin (about 0.3-0.6 mil), and they must be applied to very clean metal surfaces. The paint requires a bake of at least 30 minutes at 400° F. in order to develop its best protective properties. Such baked films provide excellent corrosion protection even after the paint has been aged for 500-1000 hours at 1000°F., at intermittent or continuous heat.

Finishes of this kind might cost well in excess of \$20 a gallon. The requirements of very clean surface and optimum application conditions must be adhered to rigidly. For these reasons, this class of silicone finish may never be a popular general-purpose finish. However, where these properties are necessary, these finishes are the only thing that can be used irrespective of what may be their cost or what are the difficulties of application.

Baking types of silicone alkyds are being promoted for heat resistant, high-bake white enamels. Unlike the aluminum pigmented paints referred to above, these alkyds can be applied at a normal film thickness of 1-2 mil. Depending on the silicone content, enamels can be prepared which retain their whiteness, gloss, and protective properties after aging for several hundred hours at temperatures of 350-450° F. Except for their high cost, the decorative and protective properties of the silicone alkyds are such as to make them ideal coatings for such equipment as *sun lamps, electric roasters, surgical sterilizers*, and other equipment developing hot spots on a painted surface. In this respect, no other known industrial finishes are even approximately competitive in properties.

The principal technical disadvantages other than cost are the usual requirements of exceptionally careful metal surface preparation, and spe-

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UNEXCELLED



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EXTRUSIONS to customer

specifications...For defense

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cial care to assure that the enamel is properly cured. At least 30 minutes at temperatures of 400° F. are required, for the better resin. These problems are proportionately less as the silicone content of the enamel is decreased, but the full dollar value of silicone purchased is difficult to realize for resins of the lower silicone content. If the quality control on a production baking operation is inadequate to insure consistently optimum application properties, particularly on the baking operation, the results obtained with silicone enamels can be discouraging. These features in great part explain the occasional disappointment encountered in shops where production jobs failed to measure up to the expectations of the laboratory data.

Hot spray finishing of aircraft

→ from Page 36

Increased smoothness and gloss

The hot sprayed films are more uniform, and have a smoother, glossier and fuller appearance. Full luster can be brought out by dry buffing, or with a minimum of polishing. This uniformity and good appearance is due largely to the fact that the lacquer is always applied at the same temperature and is not contingent on booth or atmospheric temperatures. Elimination of the sanding between coats permits a full film to remain over screw and rivet heads and other slightly raised areas where sanding often removes too much film.

Health hazards in hot spraying are reduced in two ways. First, by using heat instead of thinners to lower the viscosity of the lacquer, fewer solvent fumes are thrown off during the spraying and drying operations. This makes for better atmosphere in the booths where the work is being done. Secondly, hot spraying decreases the amount of spray fog which rebounds into the operator's face. This is particularly beneficial when spraying in small or confined areas where adequate ventilation is not available.


From the same angle, less volatile materials reduces fire hazards accordingly. This applies not only in

the paint booth area, but in storage areas as well.

Some manufacturers are formulating lacquers thinned to hot spray viscosities. In tests at Douglas, this thinned material has proved to have good package stability, and eliminates possible errors in thinning ratios or contamination during handling. This pre-thinned lacquer can be additionally thinned for cold application or touch-up work.

In a brief summary, Mitchell has this to say about the hot spraying technique as used at Douglas: "It saves man-hours and booth time; it saves critical materials such as thinners, pigments and resins. The hot spray method produces a better film by greater uniformity, less porosity, and decreased running, sagging and blushing. It decreases health and fire hazards, and saves on storage and handling."

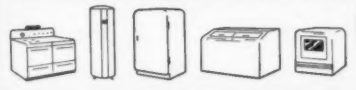

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on product performance.*

The universal appliance insulation

*Fiberglas is the trade-mark (Reg. U.S. Pat. Off.) of Owens Corning Fiberglas Corporation for products made of or with fibers of glass.

New Supplies and Equipment

F-11. New grinding media cuts batch grinding time up to 45%

The development of a new high density grinding media—super porcelain balls and brick—is said to accomplish substantial savings in both grinding time and down-time. A year's test run just completed on a hard tough grinding job, mullite grog $\frac{1}{2}$ " and smaller reduced to all through 200 mesh, cut batch grinding time 45%.

The test mill was lined half with regular porcelain brick and half with a new super porcelain brick, and super porcelain grinding balls were used through the test. At the end of the year's run, the regular porcelain brick had worn to a thinness of $\frac{3}{8}$ " to $\frac{1}{2}$ " while the new super brick had worn only to 1 $\frac{5}{16}$ " to 1 $\frac{7}{16}$ ". The balls wore smooth and uniform, with no chipped or broken balls.

F-12. Silicone-base finish protects gas heater combustion chamber



The combustion chamber and outer covering of this central gas heater, made by The John Zinc Company, are coated with a silicone-base

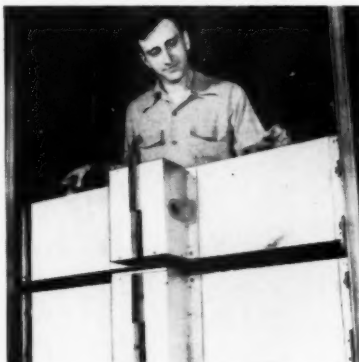
More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form, or write to us on your company stationery.

finish that is said to successfully withstand temperatures of 875° F. generated by the combustion chamber, without powdering or losing color.

This improved silicone-base heat resistant finish is claimed to withstand temperatures up to 1000° F. without blistering or peeling, or without losing color or gloss.

F-13. Pre-engineered electric infra-red oven panels



New pre-engineered electric infra-red oven panels have been announced. The panels—in two modular sizes with built-in bus bars, insulation and frame—arrive on the job complete, ready to be erected in oven structures and connected to plant wiring.

Photo shows pre-engineered light-

weight radiant panel being dropped into position. Four bolts will complete mechanical connections to frame. Depending on size and shape, complete ovens can be erected in several hours, ready to go to work.

F-14. Enamels for aluminum

Durable porcelain enamels for aluminum are now available in a wide range of colors. Thoroughly field tested, these finishes offer the combined advantages of color appeal, durability and ease of fabrication. They can be applied using ordinary enameling and firing procedures. The enamels can be used on appliances, furniture and cabinets, tanks, structural siding, roofing, etc.

Industrial literature

601. Electrostatic spraying folder

A new 4-page folder describes principles of electrostatic spraying of organic finishes. Illustrates new type of equipment for electrostatic application and describes and compares the application technique with normal application practice. Free copy to companies inquiring on their letterhead.

602. Die casting lubricants

Four die casting lubricants, developed expressly to provide clean, accurate castings, longer die life and more economical production, are completely described in a new illustrated folder on "Die Casting Lubricants."

603. Finishing room tanks made of laminated fiber glass

Information on a "completely new idea" in finishing room tanks is contained in new bulletins which give sizes in stock. The tanks are made of laminated fiber glass, and are said to be highly resistant to chemical attack inside as well as outside. They are non-conductive and can withstand freezing as well as boiling temperatures. The walls are reinforced with vertical ribs molded into the tank, and the top rail is made of one-inch diameter pipe over which is molded fiber glass.

FINISH

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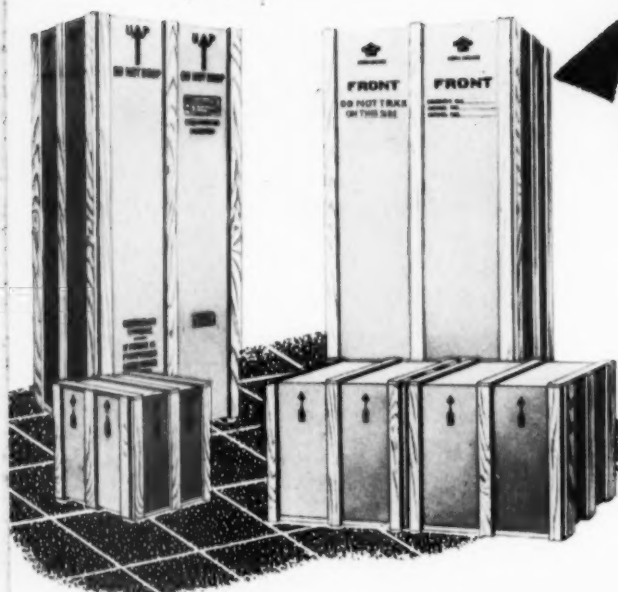
Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

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No. _____ No. _____ No. _____ No. _____
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Company _____
Company Address _____
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June • 1952

safe transit

FROM ASSEMBLY LINE TO FINAL CUSTOMER



WATKINS cleated, corrugated containers CUT SHIPPING COSTS

CONTAINERS made the Watkins way reduce shipping costs because they are scientifically designed to provide complete protection with lightest possible container weight.

Then, too, the fact that they are light in weight and arrive at your plant 75% assembled means that they are quickly and easily assembled to completely enclose your finished product, saving labor... saving time... saving expense.

To get complete protection: protection from outside dirt and dust... protection inside for fine product finishes—a smooth interior with no staples or rough surfaces.

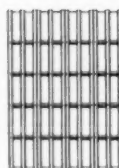
Then there is the extra "Travelling Billboard" feature providing for your advertising message in two colors on all sides. These are a few of the reasons why it is smart to ship the "Watkins Way."

Better Handling Convenience with WATKINS PALLET CONTAINER

Here are some of the products that are being shipped in Watkins Containers:

Washing Machines	Space Heaters	Sinks
Ironers	Furnaces	Air Compressors
Hot Water Heaters	Pumps	Surgical & Hospital Equipment
Kitchen Ranges	Power Tools	Sanding Machines
Refrigerators	Fans	Furniture
Filing Cabinets	Soft Drink Coolers	Television
Clothes Dryers	Stokers	Radios
Dishwashers	Oil Burners	Water Softeners
Kitchen Cabinets	Garden Tractors	Vending Machines

THERE IS A
**WATKINS
CONTAINER**
MADE NEAR YOU

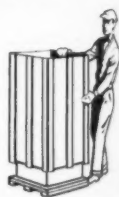


◀ **STACKING** Vertical wood cleats provide EXCEPTIONAL SUPPORTING STRENGTH to carry heavy loads. Typical crate supports 4 tons.

◀ **QUICK** Assembly line packing is speeded up. EASY TO HANDLE. Complete protection for your product.

◀ **STRONG** All wood cleats securely glued to tube-mat. Laboratory tests prove glued cleats RESIST WEAVE AND DISTORTION BETTER.

◀ **STORING** Containers are delivered flat (only 3 sections) and closely nested to CONSERVE STORAGE SPACE.



These companies build WATKINS containers

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COZIER CONTAINER CORP.	446 East 131st Street, Cleveland, Ohio
CRATE-RITE MFG. CORP., Division of Pacific Parts Ind. Inc.,	10901 Russet Street, Oakland, California
DURA-CRATES, INC.	940 East Michigan Street, Indianapolis, Indiana
GENERAL BOX CO., 1825 Miner St.,	Des Plaines, Illinois, and 16th and Maple Sts., Louisville, Kentucky
HEMB & MARTIN MFG. CO.	Waukegan, Illinois
ILLINOIS BOX & CRATE CO.	811 Center Street, Plainfield, Illinois
KIECKHEFER BOX & LUMBER CO.	1715 West Canal Street, Milwaukee, Wisconsin
LANE CONTAINER CORP.	10212 Denton Road, Dallas, Texas
LEWISBURG CONTAINER CO.	243 Singer Street, Lewisburg, Ohio
LOVE MFG., INC.	608 South Commerce Street, Wichita, Kansas

—an inquiry to any of these companies will get prompt attention—



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safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and allied metal products field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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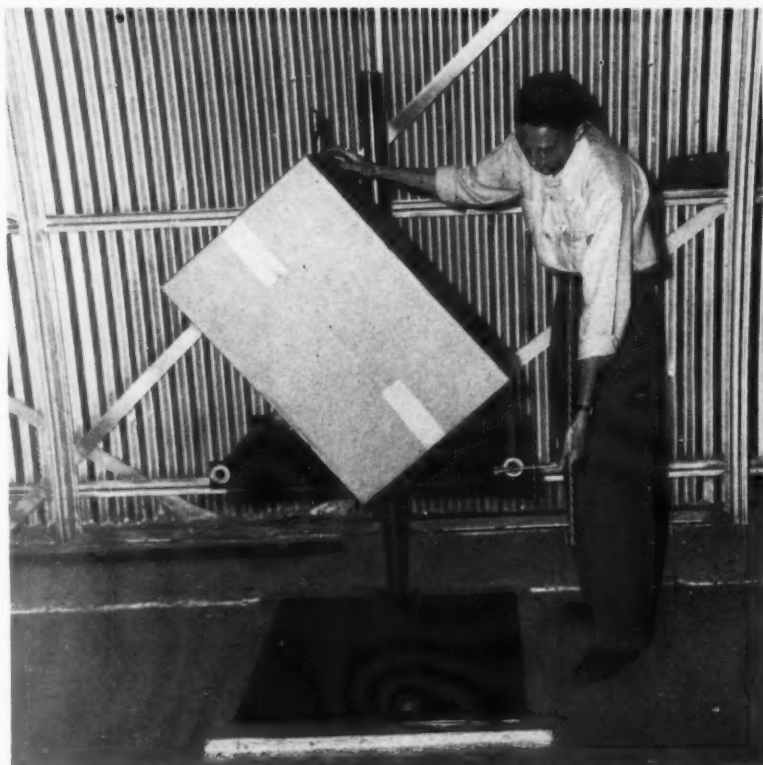
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SAFE TRANSIT ARTICLE REPRINTED

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A drop test being conducted on a packaged product—at the Pacific Coast Branch Laboratories of the American Gas Association, in Los Angeles. See story on West Coast participating in the Safe Transit Program, Page ST-7.

The 100th Safe Transit-certified company—was Altorfer Bros. Company, Peoria, Illinois. Photo shows the application of a Safe Transit Label to a crated ABC automatic washing machine. Left to right are Carl Zeman, traffic manager, N. O. Kepple, in charge of factory production, and W. Braasch, line employee, applying the Label.



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The Tight Corner is Stronger



Warehouse of a large Department Store, showing gas ranges stored in Bigelow-Garvey "Tight Corner" collapsible hinged crates.

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Wooden Pallets



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A good step in the right direction

a report of the participation of West Coast manufacturers in the NST program—and—Safe Transit testing at the AGA Laboratories

by Gilbert C. Close • WESTERN EDITOR

Exclusive feature
safe transit

Progress is the keynote of youthful West Coast industry, and as a result of this attitude, the National Safe Transit Program has been accorded a warm welcome by a number of companies keenly aware of the economic advantages inherent in better packaging to prevent injury and loss during shipment of goods. The consensus seems to be that the program is the first concrete forward step toward the solution of this serious and costly problem.

Focal point of West Coast activities along this line is the American Gas Association Laboratories, in Los Angeles. Here, under the direction of W. H. Vogan, Pacific Coast Branch manager, the packaged products of eleven major companies have been tested, or are being tested, since appointment of AGA as a Safe Transit laboratory just a year ago. To date, packaged products of five major companies have been approved to carry the NST label. Other companies are working toward the solution of packaging problems revealed by AGA's tests.

A workman tightens the metal strap that binds these loaded water heaters to one of the four freight car bulkheads employed in carloading by Continental Water Heater Co., Los Angeles. The same type of lumber is used to deck between the heater tiers.

finishfoto—Close

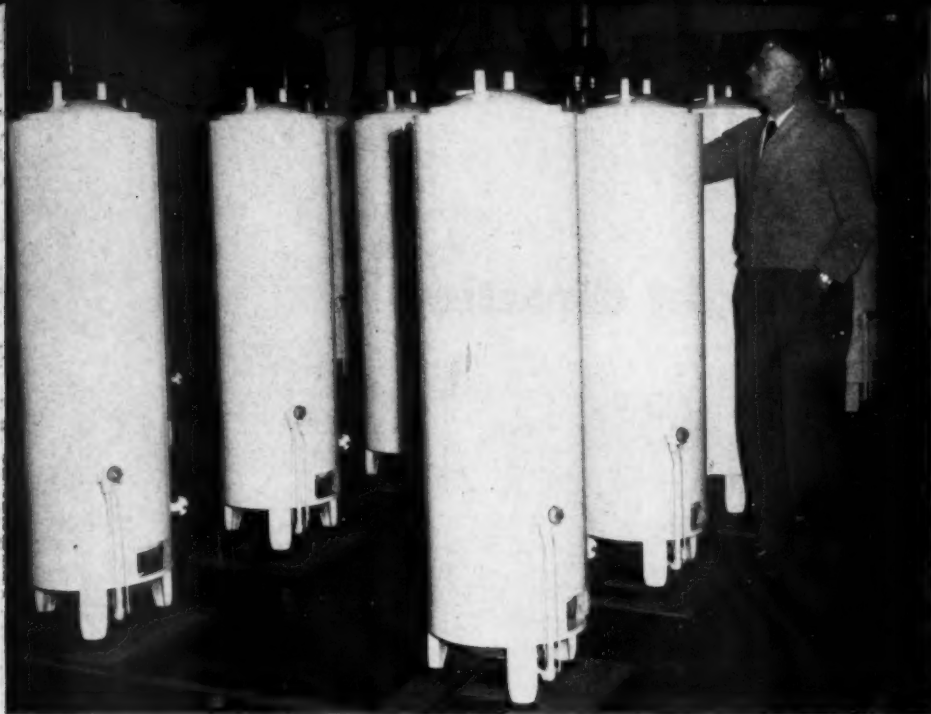
finish JUNE • 1952

"We've tested about 100 packaged products so far," Vogan says. "These included ranges, water heaters, furnaces, enameled parts, room heaters, wall heaters, etc. We've not been at this work long enough to uncover a definite pattern of results, but in specific instances, our tests have revealed

what must be done to improve crating or packaging techniques."

The AGA tests follow the usual pattern. The packaged products are first subjected to a one-hour vibration test on an NST approved vibrator. They are examined for possible damage every 15 minutes dur-





K. Eisinga, vice president of Continental, inspects an array of water heaters neatly spaced in a special crating area. Proper packaging receives major attention at this company.

ing this test. The impact tests come next. Crated products weighing over 100 pounds are given the incline impact test on all six sides. Packages weighing under 100 pounds are given the drop test conducted by dropping them 24 inches on each side and on the corners.

After these tests, all products are uncrated and examined in detail. When an injury has occurred, an effort is made to ascertain how the crating or packaging can be improved to prevent its recurrence. In

some cases, the companies try to work out their own crating and packaging problems; in other cases they work with the suppliers of crating and packaging material. The net aim in all cases is to develop a package that is safe and that fits into the production line peculiarities of the company involved.

K. Eisinga, vice president, *Continental Water Heater Company*, Los Angeles, one of the five firms approved to date for NST certification, points out that while his company

never suffered severe shipping losses, the AGA tests revealed certain weaknesses that have since been corrected. Both the top and sides of the conventional wirebound wrap-around crating were re-inforced, and stronger nails were used to anchor the leg cups in place.

Carloading method for water heaters

This company uses a method for loading box cars that minimizes damage possibilities and is strongly ap-



Continental water heaters in the production phase, and already situated on leg-cupped crate bases, pass along the flame-check test pit.

Day & Night water heaters are shown being crated as they leave the production line. Several Day & Night products have been approved to carry the National Safe Transit label.



proved by the involved carrier. Each box car is divided into four units, with a bulkhead between each. The first tier of each unit is loaded, then decked over with 1 x 6 strips. The second tier is then loaded on this deck. After the unit is completely loaded, both tiers of crated water heaters are metal-strapped to the bulkhead. This metal strapping holds the water heaters flatly and firmly against the 1 x 6 bulkhead strips, resulting in effect in a large, metal-bound package of water heaters that,

if moved, must shift as a unit rather than by bumping one against the other. The decking between the tiers prevents the overhead heaters from cracking through the underneath crate tops and causing damage.

Verne R. Mottinger, production engineer, Day & Night Division, Affiliated Gas Equipment, Inc., Monrovia, Calif., another company which has received AGA approval on several of its packaged and crated products, points out that his company always experienced some trouble and

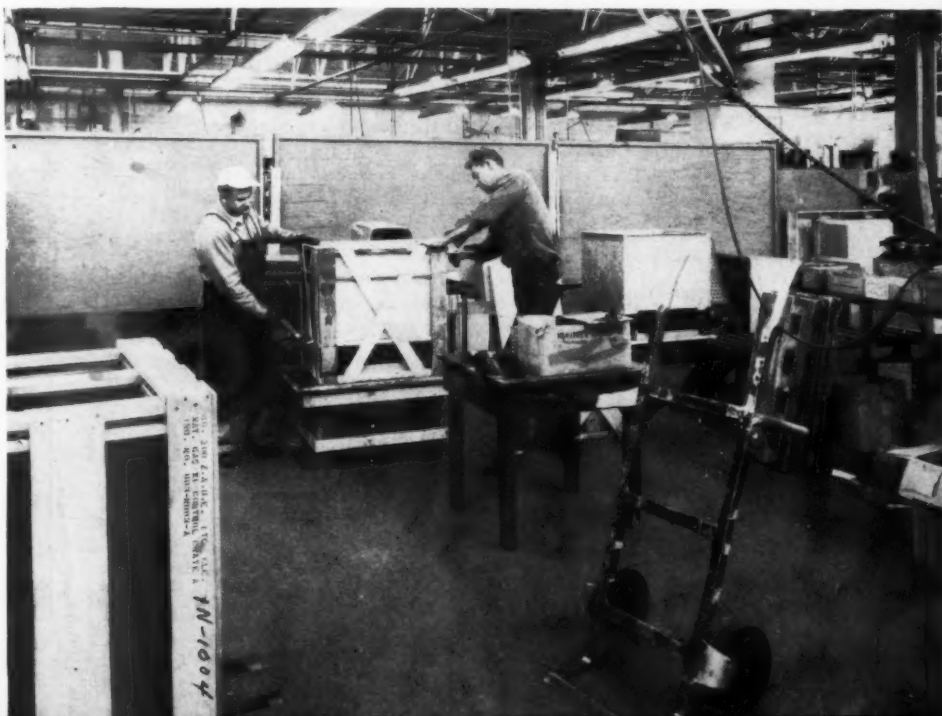
some damage during shipment.

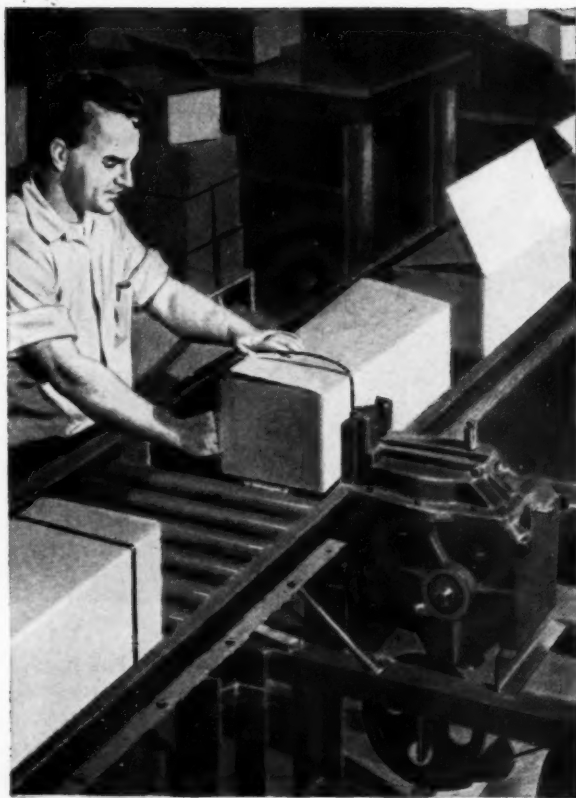
"Before the National Safe Transit Program was started, our only recourse was to re-design our containers, ship them to various points for return, then examine them to see what had happened," Mottinger says. "The facilities at AGA for local testing of packaged products has greatly simplified the problem.

\$10,000 saving on one product

"We must all realize that packaging is a very expensive part of any prod-

Crating industrial-type space heaters at the Day & Night plant. The crate being used was developed as a result of tests conducted by the AGA Laboratories (NST certified).





Signode equipment boosts output of strapped packages 190 a day!

An eastern manufacturer, using Signode equipment, was turning out 560 packages every day. He was 100% satisfied. But the Signode field man in that territory wasn't. He was sure that he could step up the output of packages and reduce unit packaging costs with Signode's new Power Strapping Machine.

The Signode Power Strapping Machine was put in the production line. The number of packages strapped for shipment jumped from 560 to 750—190 more per day! Unit cost dropped.

Yet, compared to many other Power Strapping Machine installations, this is not a particularly fast operation. In the flooring industry, for example, these machines apply up to 750 straps per hour.

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uct," Mottinger added. "In one case, after the AGA tests, we were able to modify the crating on one of our water heaters in a manner so that we will realize a saving of about \$10,000 a year on this single product."

Day & Night reaped a substantial secondary advantage from their package testing program. "We have found that the AGA tests used to determine package quality test product quality as well," Mottinger said. "In one specific case, we were continually losing burners from a furnace during shipment. We knew that the burners were in place when the furnace was given its final check, but had no way of determining what happened to them during shipment.

Case of the missing burners

"During the NST package vibration tests, these burners would fall out. We re-designed the burner hangar, and have not suffered a similar loss since. In several other cases, specific product weaknesses were revealed by the tests. In each case, it was simple to re-design and improve once we knew where the weakness existed."

It is too early yet for any of the West Coast users of the NST label to have accumulated comparative data. Nevertheless, the initial opinion is that when such data is available, it will be highly favorable. All who are participating in the program agree that the problem of safe transit has been neglected for too long and that it offers fertile grounds for reduction of total product costs. The sharp interest evidenced in the National Safe Transit Program's activities at this time are indicative of more positive action to follow. The promise of improved manufacturer-carrier relations is a bright spot in the picture that attracts many. The possibility of producing a better packaged product at less cost has already been established. Other cost-saving facets are expected to accrue as the program rounds into shape.

But the West Coast vote is unanimous on one thing . . . "It's a good step in the right direction."

Improvements in carloading techniques

including information on the latest improvements in the mobile package

by *Leo F. Delventhal Jr.* • TRANSPORTATION INSPECTOR, THE WESTERN PACIFIC RAILROAD CO., SAN FRANCISCO, CALIFORNIA

TO advance the theory that the mobile package requires features to afford more protection to its contents, Western Pacific has equipped 20 new, all-steel box cars with "compartmentizers." The compartmentizer car is equipped with two pairs of steel bulkhead gates suspended from the ceiling of the car, which can be locked into three compartments at any desired locations within the car.

By comparison with a commercial package, the compartmentizer functions similarly to a divider within a carton, serving somewhat the same purpose, namely, to cushion and restrain the contents from damaging impacts.

In addition to its damage-prevention characteristics, the compartmentizer affords saving in labor and material so often necessary for blocking and bracing in conventional cars. We have been told by shippers using our compartmentizer cars that such savings amount to as much as \$40.00 per car.

For stop-off loads

Another advantage possessed by the compartmentizer car is that it is especially suitable for loads consisting of shipments destined for two or more consignees, namely, stop-off cars. Each shipment can be bulkheaded and locked apart from the others, and if desired, sealed to prevent pilferage.

We are also considering the need for improving our mobile package in ways other than just the interior, that is, to improve the riding qualities and dissipate the vertical and

longitudinal shocks that occur during road movement.

Stabilizing spring suspension

Our first consideration is the car truck and its riding qualities. We have a number of cars equipped with



LEO F. DELVENTHAL, JR.

trucks which incorporate stabilizing spring suspension. By test comparison with conventional trucks, we have developed that the vertical oscillations have been substantially reduced. By dissipating these forces, the contents within the car are not subjected to the units of destructive force that are the result of excessive vertical movements.

The most severe element of force that the mobile package is subjected to is the end-to-end impacts when switching cars. In the future, we hope to have in service test cars employing an improved cushioned underframe. This is the type of pack-

age improvement that can be made to a boxcar which tends to eliminate the need for equipping all cars with special interior fixtures.

New flooring for boxcars

Approaching the loading problem from another angle, one of the troublesome conditions existing in many boxcars is the roughness of wood floors, causing undue abrasion of packages. In 1940, Western Pacific installed a floor in one of its boxcars with a cement-like substance, which is applied over old worn-out floors and which dries to a hard finish in a very short time. The outstanding feature of this new floor is that it is entirely nailable; will not absorb water and in the process of wearing it retains its smoothness. Nailable steel flooring has been highly successful as boxcar flooring. Almost all of the larger railroads have a number of cars with this flooring installed today. There are 5,000 box cars in general service and within the next 12 months an additional 2,500 cars will be equipped."

Some carloading techniques have been quite successful in reducing loading damage. In recent years there have been drastic changes in our carloading patterns, due primarily to the introduction of new packaging and perfected packaging which, to some extent, has eliminated blocking requirements. Also the application of wire and strap to secure carloads has had great influence on carloading technique.

Basic types of loads

Let's consider the basic types of

loads. There are three: (1) the rigid type, (2) the free-floating type, and (3) the controlled-floating type. Of these the rigid type is perhaps the most predominant.

Good examples of the rigid type load are those consisting of commodities packed in fibre board containers of one type or another. Containers of this type must be rigidly braced because they are susceptible to compression caused by the end-to-end forces acting within a car.

To prevent compression of the load and the resultant accumulation of slack, the load must be planned to create stack or unit stability. One of the most effective, yet economical, ways of achieving this stability is the brick pattern or bonded-block loads. In this load, the packages are inter-

locked or tied-in, similar to brick wall construction.

Actual tests have shown that even when bonded-block loads are employed, slack develops within the load. During these tests, a unit of fibreboard packages containing food products equal in size to the inside dimensions of a boxcar was compressed by a large hydraulic machine. Repeated tests under these conditions showed that this mass could be compressed from nine to eleven inches without damage to the packages or contents.

Use of bulkhead gates

It is obvious from the foregoing that additional protection other than that of a brick pattern or bonded-block load is desirable. Such protec-

tion can be obtained by the use of bulkhead gates or dividers located so as to divide the load into three equal compartments. Compartmentizing the load serves to confine the accumulation of slack within each unit to a point where the slack and the weight-mass force are insignificant from a damage standpoint.

Free-floating load

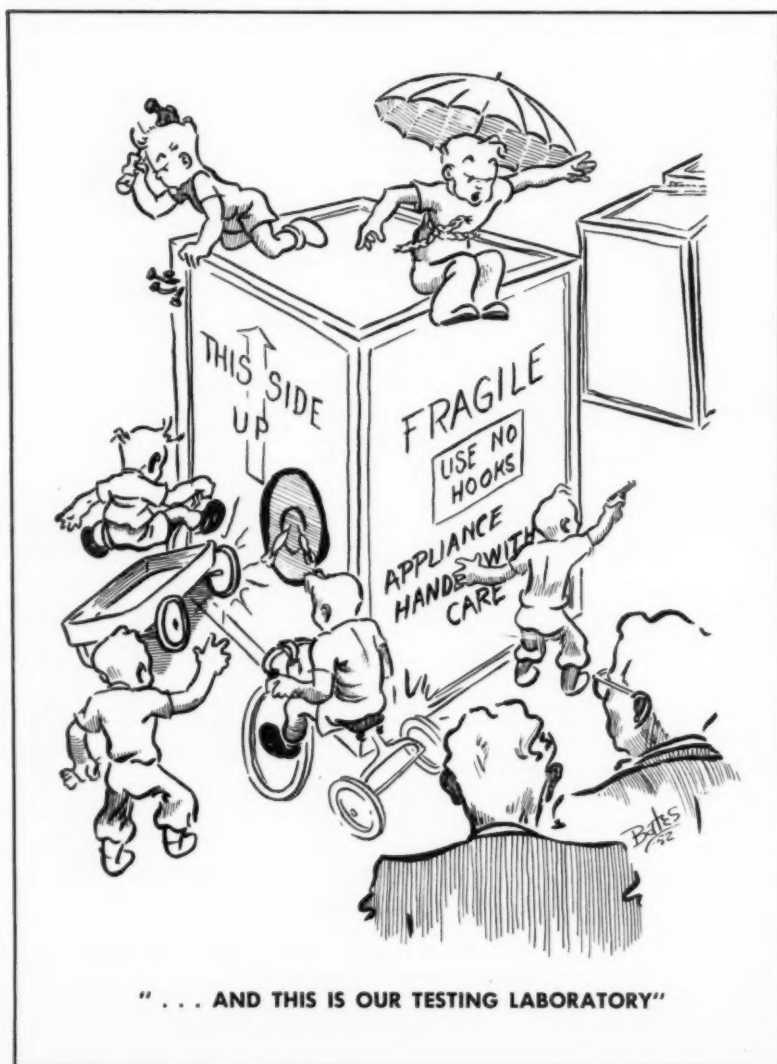
In contrast to the rigid type load discussed heretofore, there is the other extreme, namely, the free-floating load. Generally speaking, the free-floating load is used for commodities having a relatively low cube and high weight, such as tin plate, machinery and commodities in containers which will withstand movement while in transit.

The principle of the free-floating load is that the movement of the load absorbs the end-to-end shocks before they are transmitted to the lading. To achieve this type of load the individual pieces must be unitized. That is, the pieces must be banded together to form larger units numbering two or more per car. Sufficient space between units, about 18 inches, should be provided in order to allow freedom of movement. It should be noted that no restraining means of any type is used with this type of load.

Controlled-floating load

The third basic load is the semi-floating or controlled-floating types. This load is quite similar to the free-floating load with the exception that with the semi-floating load its movement within the car is restricted. This is accomplished by threading the unitizing straps through plates mounted on the car floor. These plates, called "mechanical brakemen," cause the straps to bind as they pass through. This method is used primarily to handle heavy commodities secured to skids. . .

As a special service to the shippers, we are starting a program to assist the shippers in engineering their material handling equipment requirements. Research is now in progress to improve the features on a lift-truck which will permit cases stored on



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Kieckhefer-Milwaukee knows how to *engineer* and how to *build* the kind of containers that will deliver your products safely into your customer's hands. There are 50 years of practical experience behind the products we build and sell.

We highly recommend the Watkins type container for many product applications. If your product is not suitable for this fine shipping method, we will recommend the box or crate that *is* suited to your needs.

Kieckhefer-Milwaukee has the plant facilities to meet your production requirements and we are proud of our reputation for meeting shipment schedules — we definitely meet all promised shipment dates.

Kieckhefer-Milwaukee Containers will meet your Government Specifications



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1715 WEST CANAL STREET, MILWAUKEE 3, WIS.

pallets to be loaded into the car directly, mechanically discharging the pallet and restraining the load in a unit without dropping or causing any damage to the package.

I believe future research will develop many new features in connection with packaging design improvements. . .

We have only scratched the surface with respect to improving carloading methods, packaging, and especially

freight car equipment. Western Pacific for one intends to continue research efforts in this field. As a matter of fact, we are now planning a more comprehensive investigation into these problems going so far as to set up a research bureau to tackle the job.

Adapted from an address before a Conference on Packaging, Packing, and Shipping during the American Management Association 1952 Packaging Exposition.

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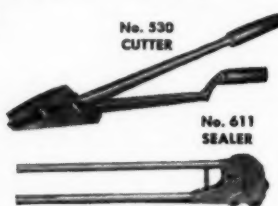
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Its soft Kraft paper outer layer won't scuff or damage the finest enamel finish. Inner layer of steel strap defies shipping shocks.

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Brace and Protect in Car, Truck or Ship

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STRETCHER



No. 530
CUTTER



No. 611
SEALER



The Stretcher pulls $\frac{3}{4}$ " or $1\frac{1}{4}$ " wide strap taut, and the Sealer applies the seal. The Cutter quickly and easily severs new strap from reel, or excess strap after tightening. It also removes and salvages strap from incoming crates.

THE LOW COST LINE! . . . You buy all A. J. Gerrard strapping tools outright. No leases, no rentals, no added expenses.

THE COMPLETE LINE! . . . BULKBINDER line for heavy duty strapping.

STEELBINDER line for general strapping.

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STEEL STRAPPING



A. J. Gerrard & Co.

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HASKELL MFG., DAVIS PRODUCTS CERTIFIED BY NST COMMITTEE

The National Safe Transit Committee has announced the certifications of Haskell Manufacturing Co., Inc., of Pittsburgh, Penn., and Davis Products Company, Niles, Michigan. This brings to 103 the total number of companies cooperating in the National Safe Transit Program.

AMERICAN WOOD PRODUCTS MARKS 25TH ANNIVERSARY

Installing the latest type wood veneer-making and wirebound container equipment highlights a plant-wide modernization program marking "25 years of progress for American Wood Products Corp., Marion, S. C., subsidiary of The American Box Co., Cleveland, O.," according to George H. Kubes, president. Kubes is the son of the late John P. Kubes, founder of the 51-year-old American Box firm, and one of the original pioneers in wirebound box and crate designing and manufacturing. He was recently elected to the board of Wirebound Box Manufacturers Association.

INT'L PAPER BOARD MEMBERS

A recent announcement states that Harvey P. Hood and John M. Kingsley have been elected to the board of directors of International Paper Company.

SAFE TRANSIT ARTICLE REPRINTED IN DIGEST FORM BY DEPARTMENT OF COMMERCE

In a letter to *finish*, Gerald L. Sarchet, acting chief, Digest Section, Office of Technical Services, U.S. Department of Commerce, reports that an article which appeared in the *Safe Transit* section of January 1952 *finish*, has been reprinted in digest form in the March 1952 issue of *Technical Digest*.

The article was "A Deluxe Model Incline Impact Tester", authored by M. A. Ritchie, of Geo. D. Roper Corporation.

Sarchet stated that digests of this type "represent the way in which such valuable technical information is sent abroad and distributed to the countries who are participants in the Mutual Security Program."

NST MAIL BAG

Perfect Shipping campaign

Gentlemen:

We were all highly pleased with the attention given the 16th Annual Perfect Shipping Campaign in your April issue.

We work by a creed; things don't do themselves — you have to get them done.

This is our guiding principle here; but of all people to say this to — considering your enthusiastic perseverance in keeping the National Safe Transit Program to the fore ever since you conceived the idea — you are just about the last one who needs any stimulant along this line.

Again let me say (on behalf of our new director, Mr. Carl A. Naffziger, as well) that we are truly appreciative of the virile support you have been giving the cause of "Perfect Shipping." . . .

A. L. Green
Special Representative
Association of American Railroads
Chicago, Illinois

"first definite action"

Report to *finish*:

K. R. Benfield, head of the Material Division of Douglas Aircraft Company, is extremely interested in the idea, as "safe transit" is one of his hobbies. He said the *Safe Transit* section of *finish* was the first definite action he had heard about on this highly important and costly subject.

Gilbert C. Close
Western Editor

packing problems in Sweden

NST Committee:

It has been with a very great interest we have read the articles "Safe Transit Reduced our Shipping Damage" and "What Happens to Your Product in Transit" in the October issue of *finish*.

As we are most anxious to solve our packing problem in the best possible way, we should be very grateful if you could give us some further

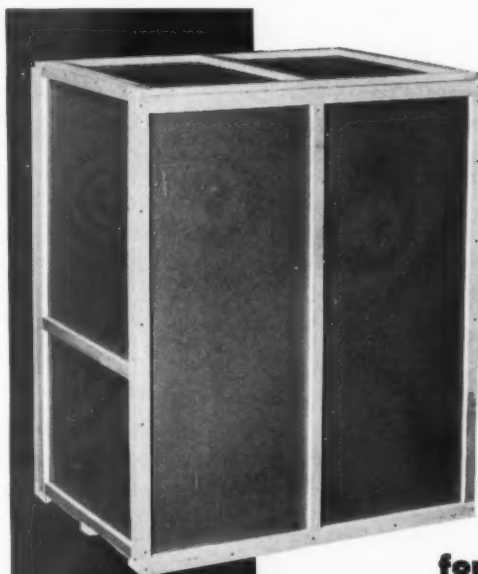
particulars and drawings on the "Conbur tester" and "Vibration tester" mentioned in the article *Safe Transit*

We should also be much obliged if a quotation could be obtained for the "Shock recorder" recommended by you.

A. E. Carlzon
Husqvarna Vapenfabriks Aktiebolag
Husqvarna, Sweden

REPORT FROM A SAFE TRANSIT CERTIFIED MANUFACTURER

"Claims for transit damage have been reduced over 50% since our supplier redesigned our crate so we could pass the National Safe Transit pre-shipment tests. Due to our Safe Transit program, we have made very great changes in our packages."



Cleated Fibre Shipping Containers

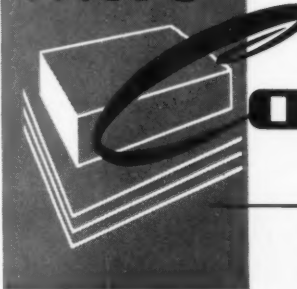
**for Refrigerators,
Ranges, Washers, Furnaces
and other appliances**

Major appliances are handled and shipped with greater safety when packaged in cleated fibre containers.

Cornell Cleated Fibre Containers are dirt-proof, light in weight, strong, and can be printed to dramatically display and advertise your product.

Cornell Cleated Fibre Containers fully meet government specifications JAN-P-103 and NN-B-591a.

FOR
boxes
... IT'S



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PAPERBOARD PRODUCTS CO.
MILWAUKEE 1, WISCONSIN

SPECIALTY PAPERBOARDS • FOLDING CARTONS
CORRUGATED BOXES • SOLID FIBRE BOXES
CLEATED FIBRE CASES • FIBRE WALL BOARDS

Not How Many...

MASS CIRCULATION media may produce inquiries in quantity—but after sifting out the teen-agers, housewives and curiosity seekers, the cost per worth-while inquiry is enough to make a profit-minded advertiser blow his top.

Take Sales Manager X, for example. A new high was set for inquiries the first week after his ad ran in a mass magazine. But, the experience of Mr. X's top contact man proved again that it's the "Who" that counts in inquiries. He followed up 21, drove 1285 miles, took a week doing it, and reported:

"Four college students were studying marketing and wanted material for their term

papers; thirteen teen-agers simply wanted mail; three were from competitors; one lady was curious. Business men contacted: none. Leads: zero. New business: naught."

To get inquiries from businessmen, advertise in the Business Press. That's where you pinpoint your audience—at moderate cost. That's where you get leads which develop into sales and profits for you. There are business magazines for every advertiser, edited for specific trade, technical, scientific or professional interests.

Ask your agency for recommendations concerning the ones best suited to your objectives, or write us for suggestions.



NOTE: The readers of *finish* are those who manage and those who buy and use the materials, plant equipment, and product components for a multi-billion dollar industry.

FINISH, an NBP publication, serves the home appliance and metal products manufacturing industries.



NATIONAL BUSINESS PUBLICATIONS, INC.

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But "Who"



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360 N. MICHIGAN AVE., CHICAGO 1, ILL.

"I saw your ad in finish"

PRESS TIME NEWS

SHARP SUCCEEDS NANCE

AS HOTPOINT PRESIDENT

John C. Sharp, vice president and chief engineer, has been elected presi-



dent and director of Hotpoint, Inc., Chicago, succeeding James J. Nance, who resigned to become president and a director of Packard Motor Car Company.

Sharp has been with Hotpoint for 23 years and served on the company's management. He is also a member of various industry advisory committees for the National Electrical Manufacturers Association. A native from Ohio, he was graduated from Ohio State University, having previously attended U. S. Naval Academy.

Before joining Hotpoint, "Jack" had started his business career in sales engineering with Standard Oil Company in Chicago. Sharp has attracted industry attention for studies he has directed on high frequency heating as well as several national citations for major appliance designs developed under his direction.

EKCO PROPOSES PURCHASE

OF REPUBLIC STAMPING

Stockholders of Republic Stamping & Enameling Co., Canton, Ohio, were expected to approve on May 19 the purchase of the firm's stock by Ekco Products Company.